

4/c23

AGRICULTURA:

OR THE

GOOD HUSBANDMAN,

Being a Tract of Antient and Modern Experimental Observations on the GREEN VEGETABLE SYSTEM. Interspersed with exemplary Remarks on the POLICE of other NATIONS:

TO PROMOTE

INDUSTRY, SELF-LOVE,

AND

PUBLIC GOOD,

By reducing FORESTS, CHACES, and HEATHS
into FARMS.

Together with some Observations on the large Exports that must unavoidably arise from thence, as well as the increase of Population.

DEPOPULATION considered. Tables calculated for the Use and Ease of the GOOD HUSBANDMAN, for Enclosing Land, Degrees in strength of various FOOD for CATTLE, and Strength of DUNGE, &c. with many interesting Instructions, in order to stimulate INDUSTRY, and accumulate WEALTH.

By MATTHEW PETERS,

Member of the Dublin Society for the Encouragement of Husbandry. and other useful Arts. Author of the Rational Farmer, and Winter Riches.

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M DCC LXXVI.

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TO HIS GRACE
THE DUKE
OF
LEINSTER,

A Friend to his Country, and an Encourager of
useful Knowledge;

THIS TREATISE
ON
AGRICULTURE,

IS MOST HUMBLY
INSCRIBED,
BY HIS GRACE'S
MOST DEVOTED SERVANT,
MATTHEW PETERS.

7

TO HIS GRACE
THE DUKE
OF
LINCOLN
A Friend to his Country, and an Encourager of
Agriculture
THIS TREATISE
ON
AGRICULTURE
IS MOST HUMBLY
PRESENTED
BY HIS GRACE'S
MOST DEVOTED SERVANT
MATTHEW PETERS.

R E F E R E N C E S

TO THE

ROTHERHAM PLOUGH.

- a **T**HE top of the beam, with its horizontal curved head-piece, on which the bridle
- b traverses to, or from land, as occasion may require, from the iron bolt that goes through the beam at
- d in both figures. And another bolt going through the bridle, and head-piece, keeps the bridle, the director of the plough, in its proper place, as occasion may offer to alter it. For a further description, see Winter Riches, p. 224 to 226, and from p. 235 to 241.

It may be very justly said, that this plough is the lightest for draught, and cheapest for general use of any now made. Two horses, or one yoke of strong oxen, well trained to quick motion, are sufficient to plough, at an average, one acre per day, in common tillage land, and nine inch furrows, working eight hours in the day; being at the rate (per day) of eleven miles journey, or one mile, one quarter, and forty perch, per hour, and one man only to drive and hold the plough.

The improvements made to the swing plough, are, first, the short beam, secondly, the acute breast, which carries its line nearly the length of a light earth board, giving an easy resistance against

against the quiescent earth; and the moving body is thereby much easier moved along, and the furrow more easily subverted. Thirdly, a vertical wheel in the chamber of the plough takes off the friction from the bottom of the plough; and a sharp pairing iron, placed close to the wheel behind, dislodges any earth that may adhere to the wheel, every time it turns round. Fourthly, a circular steel coulter, welded on to the land side of the share, being in height nearly the common depth of the furrow, suppose ten inches.

The advantage a circular coulter has over a common coulter, is very clear, (as is also the other improved parts) as no stubble, &c. can gather in heaps under the beam of the plough, which often retards the draught, almost equal to the power of one horse, and answers the same end in cutting the earth, for an easy subversion of the furrow, as the common coulter.

For this improvement to the plough, the society of Arts and Commerce at London, presented the Author with a silver medal, as a token of their approbation.

- One of these ploughs is in the possession of the above Society.

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(11)
To the R E A D E R.

THIS Kingdom's bulwark, Commerce,
which wafts her spreading sails to
every part of the globe; displaying Eng-
land's glory and Honour, is that which
unites the most distant regions.

Ought not the industrious *Husbandman*
then to partake of Honours? to which he
himself contributes, tho' domestick, yet
as truly great and beneficial to society.

Shall he, because his clouted shoes and
rustick mien bespeak him the hardy tiller
of the soil, be less admired? no; consider
the good Husbandman, as an honourable
man, as the basis and co-equal supporter of
his country. Heartily were it to be wished
that the name of *Farmer** were no more;
that the cultivator of land would by emu-
lation assume the title due to the industri-

a

ous

* Such as rent or hold land for tillage.

ous tiller of land, and become, not in word only, but in deed, what the noble *Romans* stiled such, namely, a *good Husbandman*. If the very title carries respect, much more must his judicious work, when really assisting our common Mother in scientific labour. With such, methinks hills and valleys rejoice; and for him the clouds drop fatness: She, who is inexhaustable in bounty, and Princely in profusion, displaying Trophies of greatness wherever man may cast his eye! * Is this new? no, she did so of old; she does it to all; to all that treat her kindly; to the small Farm good Husbandman, equally as with the greatest in the land: she is no respecter of persons.

Permit the Author to give an instance of her gratitude to a poor industrious Husbandman in the Roman state, one *C. Furius Crespinus*. This man had been a bond slave,

* Earth will never deceive its master, if its master doth not deceive it.

slave, but by good behaviour was enfranchised; and having purchased a little spot of ground, out of which he made much more than his neighbours, who had large possessions, they began to be jealous of him, and hated him so much as to charge him with indirect means, as if he had used sorcery, and by charms and witchcraft drawn into his own ground that increase of fruits, which would otherwise have grown in theirs. Upon complaint and information given, he was presented, and indicted, by *Spurius Albinus* an *Edile Curule*, for the time being; and a day was fixed for his personal appearance to answer the matter. He therefore, fearing the worst, at what time the Tribes* were ready to give their voices, either to acquit or condemn him, brought into the common Court his plough with other implements belonging to Husbandry:

* These were Husbandmen; for in cases of Husbandry the ancient custom of the Romans, was, to commence actions, and maintain pleas, before a court of Husbandmen.

bandry: he presented also his own daughter, and as *Pliny* says, a lusty strong lass and big of bone; yea, and as *Piso* tells the tale, well fed, and well clad. He shewed them all his plough-irons of the best making, and kept in good order, heavy coulters, strong and tough spades, weighty plough-shares, and with all his draught Oxen full and fair. When his course came to plead his own cause before the people, he began thus: "My Masters, you that are the citizens of Rome, behold, these are the charms, and forceries, and all the enchantments that I use (pointing to his daughter, his oxen and furniture) I might besides these alledge my own travail and toil that I undergo, the early rising, and late sitting up so ordinary with me, the careful watching that I assuredly abide, and the painful sweats which I daily endure; but I am not able to present these to your view, nor to bring them hither with me into this assembly."

The

The people no sooner heard this plea of his, than they unanimously declared him not guilty. " By which means, adds *Pliny*, verily every man may soon see, that good Husbandry goeth not by much expence; but it is pains taking and careful diligence that doth the deed. And hereupon came the old saying, That the only thing which makes the ground most fertile, and fruitful, is the master's eye."

The honours that were paid to Corn, and Husbandry, in ancient *Rome*, shew the high esteem wherein they held them. *Romulus* first instituted in the new built city of *Rome*, a guild or fraternity of Priests or Wardens over corn-fields, which were twelve; he being himself the twelfth brother. And *Acca Laurentia*, the nurse of this Prince, bestowed on him a garland of corn-ears, twisted and tied with a white ribbon, as the most sacred badge and ensign of this new Priest-hood, which he and his bretheren were to wear, with great reverence and devotion: and this was the

the first Chaplet known at Rome. *Romulus* at the same time assigned none of his subjects more than two acres of land.

King *Numa*, who succeeded *Romulus*, ordained the worship of the Gods with an oblation of corn. He also instituted a feast for the limits and bounds of lands: and one of the greatest presents that could be made to Captains and Soldiers, who had been valiant in the service of their country, was that of as much ground as they could have broke up or ploughed in a day, with a yoke of oxen: This was called an *arpent* or acre, being 240 feet square, nearly equal to one acre, one quarter, and eleven perches, English measure.

In so great repute was Husbandry, that the first, and chief houses in Rome took their surname from thence, as the *Pelumni*, who first devised the Pestle or Pestil, to bruise corn in their mills. The family of the *Pisons*, who took their name from *Apisendo*, that is, stamping or pounding corn
in

in a mortar. In like manner, the *Fabii*, the *Lentuli*, the *Cicero's*, each according to the several Pulse they excelled in. The house of *Junii* had the surname of *Rubulcus*, as their ancestors knew particularly well how to order oxen.

The distinction of states and degrees in the city of Rome both for wealth and worship, was according to their lands. These were called the Rustick tribes in Rome.

Manius Curius, when he had subdued and brought the Roman empire into obedience, and added so many foreign nations to their dominion; after all his Triumphs, said in his speech, "that he was not to be counted a good man, but a dangerous citizen who could not content himself with seven acres of land." And after the banishment of the *Tarquin Race*, this was the portion allotted to a Roman commoner.

We are told farther that, *C. Attilicus*, when the honourable dignity of consulship was presented to him, with commission to
conduct

conduct the Roman army, was found sowing his own field, and planting trees; where-upon he took the fir-name of *Serranus*. And when the messenger of the senate carried the Letters Patent of Dictatorship to *L. Quintius Cincinnatus*, he was found in person ploughing a piece of ground of his own, containing only four acres; which are now called *Prata Quintiana*, that is, *Quintius's* meadows, lying within the *Vatican*; and it is reported,* that he was not only bare-headed, and open breasted, but also naked and full of dust: so that the messenger said to him, "Do put on your cloths, Sir, and cover your body, that I may deliver unto you the charge that I have from the senate and people of Rome."

Books on *Agriculture* were also anciently held very sacred, insomuch, that when the *Romans* ransacked *Carthage*, in giving away to the *Africans* the libraries they found there, they saved only to themselves

these

* Says *Pliny*.

those on *Agriculture*, namely 28 volumes written by *Mago* the Carthagenian general.

M. Varro continued his love for husbandry so much, that he compiled a special book of *Husbandry* at 81 years of age. *Cato* had such esteem for husbandry, that he says, "Children begot by husbandmen, " prove most valiant, the hardiest soldiers, " and such as think the least harm of all " others."

The author, in his *Rational Farmer*, 2d. edit. p. 135, made some remarks how the community suffer by the monopolizer of farms, &c. he has taken the liberty, in this treatise, further to acquaint the reader with other more ancient opinions on that subject. *Pliny*, says, " Our ancestors " thought it a particular part of husbandry " not to have too much ground about one " grange or farm, for they supposed more " profit grew by sowing less, and tilling " it better: Such being within the compass of the master's eye, caused that

b

" pertinent

“ pertinent saying, says he, of *Cato*,
 “ That a lord’s eye is better for land than
 “ his heel.”

Virgil remarks, “ That large enclo-
 “ sures and great domaines held by private
 “ persons, have long since been the ruin of
 “ Italy, and of late days have undone the
 “ provinces thereunto belonging.” Such
 was the noble spirit of *C. Pompeius*, who
 would never purchase any land that bor-
 dered on his own; a conduct truly answer-
 ing to that greatness of mind for which he
 deserves to be celebrated.

So strict were the ancient laws of Rome
 in respect to corn-fields, &c. that by the
 law of the twelve tables, all persons what-
 soever above 14 years of age, were forbid-
 den under pain of death, either to feed
 their cattle in the night-time upon any
 corn-fields of another man, by stealth,
 which were ploughed and sown; or to cut
 the same down with scythe or sickle at
 such time, and in that manner; and who-
 soever

soever was convicted thereupon was to be hanged by the head and strangled for satisfaction of the goddess *Ceres*. And if under that age, fines and severe punishments were inflicted.

It may also be worthy our observation, that notable remark of *Pliny*, “ That as
 “ the great men of Rome tilled themselves
 “ their ground with their own hands ; the
 “ earth again for her part, taking no small
 “ pleasure (as it were) to be eared and bro-
 “ ken up with ploughs laureat, and
 “ ploughmen triumphant, strained her-
 “ self to yield encrease to the utmost.”

The dearness of provisions is not a desirable circumstance to contemplate, much less to defend ; however, the author submits it as his opinion, that in some cases this is not the worst of evils ; there are others certainly equal, namely, a reigning dissipation among the servants in husbandry, and idleness throughout the labouring people in all our manufactories ; which idleness,

however, does not prevent their usual consumption of provisions, such continuing the same by some means or other, be they dear or cheap, but labour not continuing the same less work is done in time of plenty than in scarcity.

The high price of provisions having been discussed in *Rational Farmer*, 2d edit. the author in this essay, has only made some few more observations relative thereto.

The great wastes of uncultivated land, which may be advantageously improved by tillage, is part of the present object of this treatise. Such as forests, chaces, &c. and which the author has endeavoured to deduce into a sketch of tillage; in which science, "the ancients were as curious in sowing ground with corn, as in ordering a battle array; as diligent in disposing and ordering, as in pitching a field."

The author must affirm, that TRUE HUSBANDRY is not such an expensive work,

work, or so uncertain in its production, as is the common mode and produce: * a late author of several books on tillage, has told us, that to advance land to a high cultivation will amount to 7l. 17s. 1d. per acre; as also that 100 acres of land must cost nearly 800l. and that a produce of five quarters per acre is inadequate to such expence. What that author can mean by advancing such a chimerical doctrine, and drawing such a conclusion, must rest alone with him: if to intimidate, it is unpardonable; if from ignorance, he is to be pitied; but the assertion itself is vague and groundless: if such, as well as many other assertions made use of by the same writer, were true, the occupation of *Husbandry* is not worth following, and the most uncomfortable and precarious

* If the master would but learn how to retrieve his worn out land, vide *Rat. Farmer*, 2 Ed. p. 7.

precarious employment of any among us *.

How different are those opinions from that of the great *Cowley*, who, in his discourse on *Agriculture*, says, "There are many ways to be rich, and which is better, there is no probability to be poor, without such negligence as can have neither excuse, nor pity; for a little ground will without question feed a little family, &c."

With regard to the author of this work, as *Pliny* says, "at the *criticks* hands, he never looked for indulgence, being with child, and travail, until they be delivered of somewhat against his books, calling such *Homeromastiges*. † Such cavaliers, let them say what they will, let their words run by, like rain water."

And

* The good husbandman has the pleasure to know, that this assertion is not founded on truth.

† Called so for their finding fault with *Homer's* works.

And *Cato* "called such fellows, says the same author, *Virilitigatores*, as being a compound of vices and quarrels, as these are nothing else."

The subjects herein treated on, are from the Author's experimental knowledge; and he doubts not but the public will receive the corroborating opinions of the illustrious Authors he has quoted,* as testimonies of his candid endeavours, namely, not to please the fault-finding chamber Critick, but to improve the laborious husbandman in the science of agriculture.

Lastly, the monopolising of farms, is part of the subject of the following sheets—a great encroachment on industry; yet, howsoever injurious such may be to the public and population, it will, the author is doubtful, be found difficult to retrench.

It

* The Author submits to the candid publick, if it be not more proper for a man to relate the experienced knowledge of others, when he is from his own confirmed in the truths, than to speak of himself alone.

It must be allowed, with *Virgil*, " that
 " a preference must be given to agriculture
 " before all other employments and desires
 " of men ;" but what sort of men ? Not
 many of those of our days. The mo-
 dern farmers are not satisfied with one, or
 two hundred acres; not less than seven,
 eight, nay ten hundred acres will scarcely
 satisfy many of those gluttonous appetites
 after land. How different this from the
 conduct of the great men of ancient times,
 who, as before observed, well knew the
 error of leaving much land in one man's
 hands; which is verified among ourselves.

Columella observes, that *Quintius Cincin-*
natus, before mentioned, who was called
 from the plough to the dictatorship, laid
 down his ensigns of authority, with greater
 joy than he took them up, when he re-
 turned to his plough and little hereditary
 farm of four acres.

C. Fabricius, and *Curius Dentatus*, one
 of whom had driven *Pyrrhus* out of *Italy*,
 and

and the other had subdued the *Sabines*, cultivated the seven acres, which they shared with the rest of the people, with a diligence equal to that valour by which they had obtained the peaceable possession of them; that the true offspring of *Romulus* were hardened by rural labour, to bear the fatigues of war, when their country called for their aid; and they chose their soldiers out of the country, * rather than out of the city.

Such was the unfeigned love for agriculture and industry in the first ages, that it was thought unlawful even to slay an ox, because they assisted mankind in tilling the ground. *Varro* says it was antiently made a capital crime to kill one of these labouring beasts. And *Columella* also says, that oxen were so esteemed among the antients, that it was held as capital a crime to kill an ox as a citizen.

c

And

* This shews the great use of the Agrarian law.

And this leads me to ask an interesting question, namely, to what purpose are instructions to improve agriculture, if the mode of engrossing farms, and keeping such a number of horses in pomp and idleness, with dreaming servants attending them, be continued?

It is too well known, that although his most gracious Majesty, at the opening of the sessions in 1772, told the Parliament in his speech, "That he was persuaded
 " their attention, as far as human wisdom
 " could provide, for alleviating the distresses of the poor, would not be wanting," has not had a due effect. They have indeed opened the ports for the free importation of corn and flesh provisions, without any encouragement for foreigners, or ourselves, by way of bounty. But if *America*, the only place we could hope for relief from, can at any time find markets more contiguous and less hazardous than

than ours, we need not expect such relief. *

In respect to the high price of meat, the author has in this treatise, as well as in a former, † expressed his earnest wish and endeavour to remove the cause, namely, by throwing part of the over-plowed land into pasture; do husbandry work with oxen, and stop the engrossing of farms. With regard to all this, the author is fully apprised of the farmers interest in making objections. But as it is not to selfish men the author presumes to offer these hints, but to those guardians of the people, who alone can by their power enact such laws as may be most useful and beneficial to the publick in general, they are therefore with great deference submitted to them. ‡

If

* The American export of corn is principally to the sugar colonies.

† Rational Farmer, 2 Ed. p. 108, to 148.

‡ To those the Author also submits, whether any bounty should be now continued on exportation; the high

If oxen were employed instead of horses, we must plough less land, and throw more into pasture, say the farmers: so says the author—a reformation much to be wished. It is more trouble to shoe oxen (if the land be flinty) than horses; besides, the latter cannot be so readily driven in a waggon, as horses, says the farmer: pitiful excuses indeed. These are despised by good farmers, who judiciously make use of them in the cart, as well as the plough. But above all, let us see of what use these are to the publick, in providing flesh meat, and saving oats,* as well as to the proprietors.

And first, it is well known, that one yoke of oxen in a plough, will do as much work in a day, as three or four horses,

high price is a sufficient stimulus; when the bounty was first granted, it was then useful; but its continuance, the Author apprehends, has in some measure contributed to the present evil of over-ploughing.

* The average importation of oats, from 1697, to 1765, was 11,778 quarters yearly. See p. 40.

horses. Secondly, oxen are well supported through the expensive winter with straw, carrots, or turnips, when horses must have hay and oats. Thirdly, every day the oxen work, they earn far more than their keeping; they put money into the farmer's pocket, instead of spending a little fortune in keeping horses in pomp and vanity. Fourthly, at the end of four or five years, doing their master's work in the field, and over paying him for keeping them all that time, they then are most fit for fattening, whereby they bring in to the master's, from twelve to twenty pounds each; growing more and more advantageous from the day they are first put into the yoke, to the day of slaughter; at which time, the publick reaps a benefit, and the master a large clear profit. On the contrary, horses are as a continual moth to the farmer, doing little work, eating much, pampered in wantonness, growing less valuable every year they are kept,

kept, and lastly, becoming a prey to the dogs.

The publick were informed, that in March 1773, one of the members of the senate had a scheme to tax horses of labour, thinking such would prevent the using so many. But the author's opinion, as well as that of some others, was, that this method would only enhance the price; for, while the present mode of tillage is exercised, the farmer cannot use oxen in their stead, for want of pasture to fatten them off; therefore, under the present mode of tillage, horses must be used.

The Author however, is of opinion, that the number of horses now used in husbandry may be much reduced; and, that the great expence attending them, may be retrenched by an interposition of Parliament, by giving a premium for every ox fattened and slaughtered, that hath been used in husbandry business four years. That every farmer using more than two horses for every 40 *l.* a year rent, or value
of

of his holding, to pay for every such horse so used one month in husbandry, either in plough, cart, or waggon, a sum of ~~one~~ *per* month, for every month so kept and used: to be levied by a warrant signed by any two justices of the peace, for the county wherein such act may be done, by information of two men, one half to the informer, and the other half to such poor house-keepers living in such parish, as are not on the poor rate, as the minister of such parish may think proper: this, with dividing the great farms into lesser, a stoppage put to the engrossing of farms, retrenching luxury, would cause plenty and relief immediately to prevail. These, or similar regulations, the author thinks to be the most effectual means to relieve the calamities of the poor, produce plenty, and create population: all which, however, with the greatest deference, he submits to the consideration of the candid publick.

In

In a *Plan for the Reformation of Manners*, that author justly observes, "That it is with the establishment of manners, as with the culture of the earth; if large tracts of land are granted to one man, and he will only cultivate such a portion as produces the most profit with the least expence, let this tract be divided among a thousand husbandmen, and every part will be cultivated, and produce something."

In respect to the real number of forests and chaces, as well as the number of acres contained therein, as mentioned in the subsequent treatise under those heads, from which calculations are herein made, the exactness in whole or in part, matters not, and is in effect impossible; however, the acres in both are many, and the conclusions drawn are in great part certain, and sufficient to convince mankind, that great advantages may accrue to the publick by such a step of additional tillage, both in respect to the great points of industry and population, as well as accumulating wealth
from

cannot quote a greater authority, than the above great writer, who, after mentioning the happy state of *Rome*, under the execution of the *Agrarian* laws, and the unhappy state of *Rome*, when luxury, ambition after conquest, &c. had crept in, says, "And therefore suffice it to observe, that the wars of Europe for these two hundred years past, by the confession of all parties, have really ended in the advantage of none, but to the manifest detriment of all: remark, that had each of the contending powers employed subjects in cultivating and improving such lands as were clear of all disputed titles, instead of aiming at more extended possessions, they would have consulted both their own, and their people's greatness much more efficaciously, than by all the victories of a Cæsar or an Alexander." Facts have fully proved, that England has been always drained of her men and money, by war. And it is a fact, that the wealth of this and every other nation must arise chiefly from the number of the people, their

their industry, and the wisdom of the government, in rendering both properly subservient to the interest of the commonwealth.

Where it has been necessary further to enlarge on many subjects treated of in the *Rational Farmer*, and *Winter Riches*, &c. the author has referred to those publications, to make the whole more explicit, and to avoid swelling this treatise by unnecessary repetitions.

their industry, and the wisdom of the government in rendering both property sub-
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Where it has been necessary further to
enlarge on many subjects treated of in the
National Review, and *Waverley Review*, &c.
the author has referred to those publications,
to make the whole more explicit, and to
avoid swelling this treatise by unnecessary

repetition.

It is to be observed that the

author has not intended to

exhaust the subject, but to

present a general view of it.

He has not intended to

present a complete system of

political economy, but to

show the principles on which

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INTRODUCTORY OBSERVATIONS.

WHEN we look round and survey the different states and kingdoms which fall within our knowledge, and behold them in the various situations of produce and commerce, according to the clime they are respectively seated in, we shall find each state adapting *trade* and *labour* agreeable to the temperature, soil, and genius of the inhabitants; pursuing that system of policy which most probably may answer the end of supporting such state; and of course such also must enrich the individual.

I shall therefore, by way of introduction, give a short sketch of the police of those kingdoms for our attention.

RUSSIA.

Let us take a view of that cold and barren region. View her in her unclothed state, and uncomely countenance! and we shall see a world of barbarians! who, until their great Czar politically became a handicraftsman a-

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among us, where he learned some little humanity, as a foundation to civilize a people always looked on as inhabitants of the north pole, but who are now, by their assiduity in improving themselves in the art of war, and increasing *manufactories*, considered as a respectable and powerful people.

Russia abounds with iron, timber, hemp, flax, pitch, tar, turpentine, mines, and coarse linen.

The woods also produce large quantities of *honey* and *wax*, whence, much money is accumulated by the people, who make it their business to prepare nests for the bees: in doing which, they cut down abundance of trees, dividing the trunks into several parts or cells, hollowed out, leaving only a little hole for the bees to enter. Every man that cuts down, and prepares these nests, has a proportion of the profit: by these means, the bears cannot get at the honey.

The country produceth great store of *rye*, which serves for bread, and from whence also a spirituous liquor is distilled; in improving all which, the attention and desire of the people to learn, is obvious, from the stratagems and encouragement to delude and obtain workmen skilled in all branches of trade, as well as the polite arts: and we find they are greatly extending *tillage*; the middle, and southern provinces being warm and fruitful.

DENMARK

DENMARK and SWEDEN.

These countries abound in *timber, iron, steel, pitch, tar, and copper*; and by clearing the country of wood, the inhabitants, like our industrious Americans, will be enabled to till more land, and thus by industry, create industry.

The present King of Denmark is very attentive in forming a better police in his kingdom than hitherto has existed there. The first consideration towards his subjects future comfort, was *tillage*. Through his flighty excursion (as the people was pleased to call it) to different parts of England, improvement was his object, and in particular, *agriculture*, which he strenuously enforced the instant he returned to his own dominions, in the year 1769.

HOLLAND.

The Dutch are generally looked on as a boorish kind of people, a heavy and dull generation; but such-like odiums seem to result from the general disposition of nations, one against the other.

Consider the Dutch in their trade, police, tenacious labour for gain,* watery situation, and

* Dr. Tucker observes, that ships are built as cheap at Sardam, in Holland, where the necessaries of life and wages

and astonishing commerce ! you will then say, they are a wise people. Behold their numbers, and the usefulness of such numbers ! the *Infant* making *toys*, and the *Parent* filling the world with childish folly ! But these are wise acts, and industry generally carries with it its own reward.

Will any man say that a Dutchman would turn his back to profitable instructions ? no, tell him but of six-pence to be gained on any additional improvement, and it shall be conveyed to Shetland, Surinam, spicy Ceylon,† and Borneo. These are wise and useful acts, acts of self gratitude, and highly consistent to accomplish the end for which man was formed a rational being, namely, to display *God's wisdom, power, and greatness* throughout the world.

SPAIN.

Let us take a short view of Spain, and behold that intemperate climate, either burned up,

wages cannot be cheap, and where not a stick of timber grows, as in almost any land whatever, even such countries which have the raw materials just at hand.

† All the spice they cannot sell at a certain price, they destroy.

Note, the Dutch begin their herring fishery on the west of Scotland 600 miles from home, whilst we take little notice of that useful, and beneficial trade, which brings in, according to Sir Walter Raleigh, upwards of ten millions sterling profit to the Dutch yearly.

up, or the fruits of the earth destroyed with torrents of rain ! they can no more depend on their own labour for bread, than can the Italian states, under their present dissipation.

Spain has money, therefore its inhabitants are slothful in the field,* except those of the southern provinces descendants of the Moors, who were a people that did not look on *Husbandry* as a low employment. They are however, very attentive to such trade as suits their police, to a strictness of rigour ; but for want of a spirit of industry, Spain is thinly peopled ; their Peruvian mine serves only to make them poor,

EAST INDIES, &c.

We may also wander to the Eastern people, and give a peep at the industrious and populous Chinese ; there we shall find self-care equal with the spice-destroying Dutchman exemplified, by the rigorous watch over strangers, for fear their art should be stolen ; wisely considering, that if it were made known, they would soon hear of rivals.

We generally look on the Eastern people with an eye of indifference ; but if prudence and mutual assiduity for preserving a state,

* Ustarite, says, that the poor farmer in Spain is obliged not only to let his poor ground, but his good land also lie fallow after a good year, from poverty : by which, says he, a good year, produces a famine the next.

state, are consonant with wisdom, then I will venture to affirm they are a wise people: for in the common acceptation of prudent things, "Wisdom rolleth in her own bosom, bereaveth not her self."

There is nothing more self-evident than the reasonableness, and propriety of self-preservation; it is this that stimulates our endeavours, and prompts us on to seek out for more knowledge, that thereby we may obtain wealth to be enabled to do more acts of humanity: knowledge increaseth riches, and riches relieves the poor. Knowledge, and riches, are co-inciding ingredients to a virtuous mind; from whence, the abundant hand, and bounteous heart, flow in contact. *Slothfulness* covers a man with rags, but *industry* with honour and glory: *Slothfulness* is not only an enemy to itself, but an enemy also to mankind; for whatever does not answer the end towards supporting society, is a public nuisance to it: man cannot be said to be industrious who has not self for his centre; from whence, as from a centre, the social rays must extend,

FRANCE.

The last kingdom I shall mention is our rival neighbour, France. Trace her but a few years back, and you will find her, even at the treaty of Aix la Chapele, much impoverished.

poverished, destitute of provisions, her armies almost starved, and her country full of calamity: but see her now, see her in a high state of *Tillage*, by which, in half a century more, she will bid fair to defy Europe, were it to combine together to withhold corn from her.

It is not the peasant alone that this depends on; no, it is the great, the wealthy men who thus stand forth and shine so brilliantly among them: such as, *Dubamel, Dian Court, &c.* And who is it at Geneva that lays his shoulder to the plough? the first in the state, the great husbandman *De Chateauvieux*. Those ought to be examples for England. Tho' perhaps, the English may disdain improvement from those people: but let them, or any other state or people be low in our opinion, prudence will learn from good instructions, always carrying this maxim in her pocket book, *Consider the matter, not the man.*

The strong connexion which subsists between *Dubamel, Dian Court, &c.* the *Agricultural Tulls of France*; and the *Geneva Mons. De Chateauvieux*, seem to indicate a double strengthening of *Tillage* to France. *Mons. De Chateauvieux* is forwarding it in the Swiss Cantons to the utmost of his power; over whom the French hold a red, as a late transaction of that nation, at Geneva, fully testifies. These gentlemen communicate to each other

other the result of every experiment that tend towards the promoting Agriculture. Each is indefatigable in experimental pursuits, in the drill system, which are sacredly from time to time, set forth to the world. This has put it past all doubt, that they are in earnest, how much so ever we may endeavour to flatter ourselves to the contrary : and there is but one circumstance in our favour to prevent a sudden rivalry, viz: the drill mode, indiscriminately, which they have stumbled upon.

From the foregoing circumstances, some observations and conclusions may be drawn.

Let us with hearts united, and animated spirits, not out of resentment, but out of jealousy to our rivals, apply that jealousy with prudence : learn from their wise system, improve on others wisdom, nor ever think we are too learned to learn : let our reflection on other states, be an incitement to draw home their good policy to ourselves ; let reason be our guide, considering ourselves as one, all tending to the same centre ; that through all the manoeuvres of state, we may still look on ourselves as a composition of individuals formed into stations, power, &c. for the well governing the whole ; so that by supporting the state, we support ourselves.

The Northern, as well as Southern countries were not anxious about *Tillage*, while they seemed to think themselves secure of supply
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from England; and 'till within these few years past, were constantly so relieved. The French, as has been observed, did not enter on that industry with any spirit 'till of late years; they felt however in time the want of it, and set their shoulders to work, to accomplish it: and indeed, they bid fair for supplanting us, as in all probability, the time will come for that trade to be reverted; they having laid it down as a fundamental maxim, that the power, and greatness of a state, must be, where such a state has Agriculture for its basis.*

The landholders of France have three great advantages against those of England, viz. rent of land, and labour being cheap, and doing their work with oxen. Tillage, is with them as it was with us a century past; their land fresh, and cheap;† with us, dear, and nearly worn out: their oxen are also of little expence to them; our horses dear, and a fortune lost in keeping them.

Hence, if we would wish to enjoy the title of rationals, let us lay aside the ways of folly, and follow Wisdom's path. Let us learn at her school, nor longer be indolent and stubborn. "Go to, thou ant thou sluggard,

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* Mons. De Noailles on the trade of France.

† We are told that the taxes in France amount to half the rent of the farm. That 200 acres of arable; 15 of meadow; and 400 of common, let for 25 pounds a year, round *Voyer*, *St. Germain*, and *Depra*.

consider her ways and be wise." Be assured, he is not only a sluggard who appears lazy, indolent, and slothful in bodily labour, but he also who is indolent in learning, in improving, and obstinate against his own good.

Neither let us act by ourselves, the unfaithful part of the spies who were sent into the land of Canaan, who saw, but would not see, neither would they suffer their brethren to be benefitted by it. Though they went to see the land, and brought some of the fruits thereof thence, but after all, they discouraged the people, by imaginary difficulties, notwithstanding the many experiences which they had received of the power, and providence of God toward them. But, let us act the part of friendship to ourselves; be steady and firm, wise in oeconomy, a true emulation, and ever open to conviction.

Here we are led to the principal object England must ever keep in view; to that interesting subject on which I ground this dissertation, namely, tillage, or in a more powerful term, the landed interest—to increase tillage, and pasture, by a scientifick knowledge, that land may be manured with pure nature, with the essence of riches, the oily juice of the pure vegetable kingdom, unpoluted, untainted, but with its own fermenting quality; free from the seeded horse dung-hill, the mortal enemy to tillage, and good husbandry;
poison

poison to the light land, and not even to be mentioned, in respect to many other manures, for the heavy; and an unwelcome guest to corn, in any. Then would the taste of the earth be sweet; for to use Cicero's words, "better are esteemed the sweet compositions and ointments which taste of earth, than of saffron."

And here to answer the purpose, many digressive facts must be entered into, to illustrate and bring to light, tho' perhaps not in perfect order, these truths which are the end of our enquiry.

Hence, I shall recite heads of a letter published by a man in business, some few years past.

"While we have been blest with cheapness and plenty, they (meaning the French) have often been pining with want, and have been obliged to pay us more than a million at a time to keep themselves from starving. But matters now begin to wear a very different face, as appears by a letter now before me from a gentleman at Havre; the purport of which is, that France being warned by experience, and jealous of our advantages, is giving all possible attention and encouragement to tillage; and has so far succeeded as to be able in the last year, not only to supply the demand of her own islands and provinces, but to send great quantities to foreign markets."

Labour

Labour being cheap in France, and industry increasing, it enables them to carry on their work, at a much less expence than the English.* And I am doubtful, that in a short time it will be found too true, that the odds against England, in husbandry, will be two to one.

An industrious people, under such circumstances, are enabled to work, both in husbandry and manufactures so much cheaper, as the necessaries of life are so in proportion, than in other states where dissipation and luxury are not so prevalent among the lower tradespeople; and, in particular, under a good police, labour will always be made adequate: that is, labour will be enforced, and wages regulated.

It may be said, England is possessed of laws, whereby they can enforce the one, and limit the other: true, but I must beg leave to make a distinction between a police well governed, and good laws ill applied. Laws, without execution, are only a dead letter; shadows to amuse, whilst the substance is neglected.

ON

* In France labour is three-pence, or four-pence a day in husbandry work: wheat, sometimes at one shilling and seven-pence to two shillings and five-pence Winchester bushel. Hence, a price they call dear, and is so with them, would ruin our Farmers; and a price we call cheap, would enrich their Farmers. To husbandmen in France, and Germany, twenty-pence a bushel is as high a price, as four shillings and six-pence in England.

ON PROVISIONS.

The foregoing introductory lines, I presume, may furnish us with subjects necessary for the present purpose; among which, I shall first consider, how the high price of the necessaries of life, affects industry among the lower trades-people. In discussing of which, I am doubtful, that my hypothesis will not be very acceptable, namely, Whether the cheapness of provisions in many cases, does not create idleness.

If idleness among manufacturers be predominant, such manufactory must be retarded; if retarded, few goods must be manufactured; and if fewer goods be manufactured than the common consumption demands, of course a scarcity of, and an enhanced price on the few, must take place.

To say, the cheapness of provisions produceth idleness, may perhaps be a maxim subject to censure, as it imports, that dearth of provisions would cause industry; and I am aware, that in general this will be looked on as an unchristian-like supposition: however, I am afraid that facts will demonstrate this paradoxical opinion to be true, as most of the manufacturing masters in his Majesty's three kingdoms too sensibly feel by the idleness of journeymen, from week to week, and from year to year, when provisions
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are cheap ; most of whom are idle, from one to three days in every week ; whence, it may be relied on, that one fourth of their useful time is lost, through an idle dissipation, in all sort of manufactories,

Well might Judge Willis, in his charge to the Grand Jury of Northumberland, &c. in the summer circuit 1771, say, " take care what ale-houses you licence ;" remarking, that the dissolute lives of a great part of our manufacturers, and low tradesmen, was owing to the great number of such low tippling houses. Adding, that he was sorry to observe to them, " our manufactured goods were under-sold by others in foreign markets, intirely owing, in his opinion, to the same cause."

To assert, that when provisions are cheap ; when heaven pours down its blessing of plenty ; when earth and man smile at each other, and the widow and fatherless look with some degree chearful ; that this blessing (for want of making a proper use of it) should prove a curse, is a harsh saying ; but harsh as it may be, it is too true ; and idleness being the consequence, which in all lands must be a curse, but more particularly so in a country like England, where industry only is the Peruvian mine.

The observation of the great Sir William Temple, on the trade and genius of the people of Ireland, may as well be applied to any other

other kingdom, or people, under the same circumstance. He says, "that in order to advance the trade of that kingdom, provisions must be rendered so dear as to enforce a general industry." *Petty, Child, &c.* All agree in the same opinion in general, "that trade can never be greatly extended where the necessaries of life are very cheap."* So right were those gentlemen in their opinion, that to my knowledge, so late as the year 1735, provisions were at so low a price in that kingdom, that the greatest indigence prevailed in all denominations of the lower class, a preference of industry being given to the linen weavers in the north of Ireland:† yet, I cannot acquit them of indulging too much, when provisions were at too moderate a price, as, it caused a great deficiency of work. If provisions rose high, still they lived by their labour, and ate as plentifully then, as ever, so that there was really no alteration but that of their not idling two or three days in a week, as they had done when the necessaries of life were cheaper.‡ Thus, plenty produced idleness, and scarcity forced industry. How-

* We are to understand, by very cheap, a price something under the price of labour. If provisions are higher than labour, it is a spur; if lower, indigence is the general consequence.

† These are in general protestants.

‡ Notwithstanding a very good law in being, to enforce labour in that kingdom.

However, we need not go further than our own kingdom for examples, the matter being as evident in England, as in any country whatever.

But, in process of time, industry and labour among the native Irish began to be diffused, and in a few years, the face of the country was much changed; chiefly from the rise of rents, and provisions; this, together with the spirited protestants forming themselves into a society,* for the encouragement of husbandry and other useful arts; and with royal and parliamentary aid, with premiums, produced such a spirit of emulation through that kingdom, as to give immortal honour to the promoters; winning as it were, the peasant out of sloth, by a mere toy, to useful industry.

Thus, every Art† and Science encouraged, invention and industry, through necessity or inclination, has prevailed. Had land and provisions continued as they were, at the first mentioned period, poverty and idleness, in all probability, would have remained to this day. The maxim, "that necessity is the mother of invention," has there been verified, and

* Incorporated by Charter, April 2d, 1750. The first society of this kind: Scotland followed the example, and England was the third, in the British dominions.

† An Academy for painting, drawing, &c. Established by the society.

and confirmed the foreseen opinion of the before-mentioned able writers.

But, shall we make a parity, and draw conclusions between England, and Ireland, on the present subject? I fear we must—I fear a parity is too true in respect to the matter now in hand; the act and effect being the same here as there, though from different motives.

The indolence of the lower class of people of Ireland principally proceeds from a natural habit, and having no example of industry before them; and this even continues without a parish support in view to give them any hopes of relief.*

As the quantity of linnen manufactured, in Ireland, depends on the before-mentioned circumstances; so our manufactories in England suffer, be provisions dear, or cheap; licentiousness among the low trades-people, prevailing more in England, than in either of our sister kingdoms.

That luxury † has crept into England of late years, no one will deny; and the footing it has got among the lower people, makes the consequence more to be dreaded;

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* No parish support is established for the maintenance of the poor in Ireland.

† Dr. Price justly observes, that Luxury enervates and debilitates the inhabitants of any kingdom, destroys virtuous industry, and brings on poverty, dependance and venality.

this has possibly arisen from a mistaken notion of liberty, and the ill use of our laws; the executive power of which, being often improperly placed, and of course, ill applied, their utility is confounded and made nugatory.—Thus for example: One magistrate shall be found easy, tender, and indulging to a degree next to a palpable cypher; another, altogether the reverse; cruel, passionate, unforgiving, and tyrannical, as an inquisitor general. The former will suffer the offender to intrude and trample on the laws, by too much scrupulous lenity; while the latter, will force an offender in trifling matters, into more wantonness and disobedience of the laws, making his mind rancorous, against authority, by over-stretching his delegated power.

It would be doing great injustice to England, to say, the people were not industrious; but then, cast you eye round and see who these industrious people are. The mercantile man will appear before you; and the wealthy manufacturer shine in business: the small high rented farmer working hard, and toiling in his own way.

But what is to be seen among the lower set of trades-people? more idleness; being possessed of a false, delusive idea of liberty, as having a right to work, or not, as they themselves may be disposed; therefore, idleness takes place if they can earn in one hour
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as much as will maintain them the next, comparatively speaking. Thus, a large family, with some sickness, soon brings them to the parish, which they know must support them, let the cause of their poverty be what it will. Thus, idleness creates poverty, and poverty burthens the state.*

From these principles some facts may be deduced, namely, that plenty promotes idleness, which is a bane to manufactories; that to make people industrious, provisions should be dearer, in proportion, than the price of labour; that according to the price provisions bear, so labour should be regulated, and enforced.

It may be asked, are not the people of England as wise, sensible, and discerning, as any other nation whatsoever? It will be answered, yes—the wisest people in the world. On this, give me leave to observe, that as long

* The author of the Political Survey of Great Britain, observes, “That cheapness of provisions is an essential article towards the support of manufacturers; and going easily to market is all that is farther wanting to render labour and manufacturers thoroughly successful.” With great deference I must add, that industry, natural or artificial, must coincide to make it successful; there is no place where commodities are manufactured cheaper than in Holland, and yet no place where provisions and taxes are higher; so that their wealth proceeds from industry alone. Natural I say, that is, from inclination—artificial industry is forced, or obtained by premiums, bounties, &c. As encouragement begets industry, so industry begets improvement and wealth.

long as man continues partial to himself, it is impossible to remove that obstinate self will; as conviction, and truths, are set at defiance.

Now let us only draw a sketch of this part of police in the little republic of Holland: and I dare say, we shall be able to trace industry there, in an unremitting course: her poor made useful, oeconomy and prudence demonstrated in all her actions; obtaining wealth by indefatigable perseverance, from every quarter of the globe; no street vagrants, no loathsome spectres, vicious nufances, or alms-asking abuse; the judicious police of that country prevents those unbecoming scenes; prevents charity from being perverted to useless purposes. Thus, morality is more effectually preserved, and immorality in part prevented, by, discountenancing idleness, and forcing industry. Thus, as indulging idleness brings on a curse, so enforcing industry must ever draw on a blessing.

To assert that taxes, dearness of provisions, &c. create poverty, in an industrious populated nation, is certainly a mistaken notion, under a good police. Where will you find a spot, under the same circumstances of situation, soil, &c. so wealthy as Holland? Is England burthened with taxes, imposts, &c. equal to the Dutch provinces? I believe not,

if the account be true, as published in 1770, intitl'd; *Thoughts on Trade and Commerce*.

This author, mentioning the trade of Holland, says, "the impost upon all bread-corn ground in the mills of Holland, which every body pays without exception, amounts to the prime cost of the corn. The excise on beer is high, the brewer pays 12 pence a barrel; private families pay 20 pence a barrel more. Victualers or retailers, pay another 20 pence. Butter pays 6 shillings a barrel. Tobacco 10 pence a pound. Fish 20 pence a pannier. Soap 11 shillings a barrel. Every horse, above 3 years old, pays 3 pence a month. Every coach pays 10 shillings a year. Every little bark 20 pence a year*. All cattle, sheep, or hogs, pay one seventh of what they are sold for. All wood, made use of for fuel, pays one eighth part of what it costs. Every master pays 20 pence a head, yearly, for each servant, male, or female. Household furniture one ninth part: and woollen cloths one fourth part of their value."—"In one word, (says he) the Dutch pay

* De Witt assures us, that the Dutch employ a thousand busses annually in the herring fishery on our coast; that these busses, with the vessels that attend them, and are employed in carrying and disposing them all over Europe, amount to many thousand sail, employ upwards of 100,000 hands on shore, in their maritime provinces; and that on a moderate calculation it appears that this fishery is worth annually ten millions sterling to the Dutch.

pay excise for every thing. There is not a turff, or log of wood in their chimneys, not an herb, or onion in their gardens, but pays a duty, more or less."

Notwithstanding, view their streets, and view ours! See their industry, and our idleness!

But, say you, Holland is a republick, and therefore, a police suitable to such government may be a very improper police in another. To which I answer, man is man in all countries, all are born with the same faculties, but biassed by prejudice in education. It is not the clime, the air of Holland, or France, can lessen the merit of salutary laws; a good law in one country, is a good law in another, under circumstances relative to industry, &c.

Every man knows, that the manner in which we execute felons, is very short of answering the end of such execution, namely, to deter; since it has no more effect on the spectator, or criminal, than if no crime had been committed: neither is the execution, as intended, solemn or awful, 'tis no more than a mere puppet show. If laws were introduced to make the punishment greater, and, where it was absolutely necessary to execute a man,* more solemn and terryfying, I am of opinion,

* Which capital punishment should be restricted to the case of murder only.

opinion, that horrid crimes would be fewer, and many useful lives preserved that are now sent out of the world for offences, not adequate to the loss of a subject's life.

For robberies, &c. some adequate restitution might be made to the publick, and life preserved by proportional punishments, tenfold more affecting the criminal, and terrifying to individuals, than a momentary passage.

Such sentiments, perhaps may have the epithet of barbarous and savage applied, among a corrupted and licentious people; but give me leave to say, that whatever tends most to the reformation of manners, on which religion, industry and publick good depends, must certainly be the best police: to plead custom, or country against truths, would be like a man dashing out his brains against a post, the danger of which he saw others avoid.

Monf. Voltaire, in speaking on the execution of malefactors, in his history of the Czar Peter, introduces this circumstance: "The Princess Cathrine, Empress of Russia, whose lenity was carried to a degree unparalleled in the history of any nation. Had promised, (says he) that during her reign nobody should be put to death; and she kept her word. She is the first sovereign that ever shewed this regard to the human species: male-

malefactors are now condemned to serve in the mines, and other pubick works; a regulation not less prudent than humane, since it renders their punishment of some advantage to the state. In other countries, they know only how to put to death with the apparatus of an executioner, but are not able to prevent the commission of crimes. The terror of death does not perhaps make such impression on evil doers, who are generally given to idleness, as the fear of chastisement and hard labour, renewed every day."

Thus, having briefly expatiated on national self duty, as essentially necessary to excite, co-operate with, and enforce industry, I shall, from thence, enter on the material part of the design of this dissertation, namely, the promotion of Agriculture; on the stability of which, England's welfare depends.

The Scheme, though of the utmost utility, and universal concern, I am aware will meet with too much opposition; notwithstanding which, animated with a sense of duty, I am resolved to contribute to the utmost of my poor abilities, to forward so salutary an undertaking, by giving a crude plan for reducing Forests, Chaces, and Common Heaths, into a tillage state; a plan which I doubt not but some masterly hand will, in due time, complete.

SECRET - U.S. COMBATANT

The latter 15,000,000, may be again divided

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has been used for the purpose of the present study.

vided into 2,325,000 acres under forests,* exclusive of the New Forest, and Forest of Dean in Hampshire, both which may be computed at 186,890 acres. Under chaces 728,000 acres. Under common heaths, 3,053,000 acres. Under common greens scattered in respective parishes, 500,000 acres. Under downs, and plains, 2,000,000 acres. Under improvements, woods and coppices, and roads, 2,500,000 acres. Under swamps, and water, 1,813,110 acres. And under barren or unreclaimable land, 1,894,000 acres.†

I. Of FORESTS.

After reserving the New Forest, and Forest of Dean, for the use of the Navy, there will remain of forest land, at a common computation 2,325,000 acres. Of this number, I shall recommend that one third be under pasture, namely, nearly 775,000 acres. The other two thirds, viz. 1,550,000 acres, under tillage, timber, and coppice wood for the use of the farms, of which, for the latter use, 51,150 acres; leaving for tillage 1,498,850 acres; of these, one fourth to be wheat, yearly;

* Upwards of 34 thousand acres on an average to each Forest.

† Be the number true in whole, or in part, it matters not as to the main scheme, there being no true survey to be obtained; but the calculation in respect to profit, in a proportion, will hold good. We are told that there are 69 Forests in England.

yearly; namely, 374,712 acres; and for barley, oats, &c. 1,124,138 acres.

The above 2,325,000 acres, to be divided into farms of 500 acres each; making by the said computation, 4650 farms; to be leased out for 50 years, at 125 l. a year, being, 5s. an acre. That such farms be subdivided into, pasture one third, namely, 166 acres; and two thirds under wheat, 80 acres; and one third under barley, oats, &c. 242 acres; under timber and coppice, 11 acres, of which, 2 acres to be oak timber, 5 acres, ash timber, 1 acre, oak and ash poles; and 3 acres, coppice wood; obliging the tenant to plant 4 acrons, and 4 young ash plants, for every oak, or ash tree, that may hereafter be cut down for the use of the farm; and, as such may grow up, to take away three, and leave the fourth to grow for timber.

We shall next consider what advantage may arise to the publick, as well as to government, by stating each farm, as debtor and creditor.

Forest.

vided into 2,325,000 acres under forests,* exclusive of the New Forest, and Forest of Dean in Hampshire, both which may be computed at 186,890 acres. Under chaces 728,000 acres. Under common heaths, 3,053,000 acres. Under common greens scattered in respective parishes, 500,000 acres. Under downs, and plains, 2,000,000 acres. Under improvements, woods and coppices, and roads, 2,500,000 acres. Under swamps, and water, 1,813,110 acres. And under barren or unreclaimable land, 1,894,000 acres.†

I. Of FORESTS.

After reserving the New Forest, and Forest of Dean, for the use of the Navy, there will remain of forest land, at a common computation 2,325,000 acres. Of this number, I shall recommend that one third be under pasture, namely, nearly 775,000 acres. The other two thirds, viz. 1,550,000 acres, under tillage, timber, and coppice wood for the use of the farms, of which, for the latter use, 51,150 acres; leaving for tillage 1,498,850 acres; of these, one fourth to be wheat, yearly;

* Upwards of 34 thousand acres on an average to each Forest.

† Be the number true in whole, or in part, it matters not as to the main scheme, there being no true survey to be obtained; but the calculation in respect to profit, in a proportion, will hold good. We are told that there are 69 Forests in England.

yearly; namely, 374,712 acres; and for barley, oats, &c. 1,124,138 acres.

The above 2,325,000 acres, to be divided into farms of 500 acres each; making by the said computation, 4650 farms; to be leased out for 50 years, at 125 l. a year, being, 5s. an acre. That such farms be subdivided into, pasture one third, namely, 166 acres; and two thirds under wheat, 80 acres; and one third under barley, oats, &c. 242 acres; under timber and coppice, 11 acres, of which, 2 acres to be oak timber, 5 acres, ash timber, 1 acre, oak and ash poles; and 3 acres, coppice wood; obliging the tenant to plant 4 acrons, and 4 young ash plants, for every oak, or ash tree, that may hereafter be cut down for the use of the farm; and, as such may grow up, to take away three, and leave the fourth to grow for timber.

We shall next consider what advantage may arise to the publick, as well as to government, by stating each farm, as debtor and creditor.

Forest.

Forest. The Farm Debtor.

Rent of 500 acres at 5s	
per acre	125 0 0
Expences for tillage of	
322 $\frac{1}{2}$ acres at 2l per	
acre	644 13 4
Out of the above 322 $\frac{1}{2}$ a-	
crees, 80 $\frac{1}{2}$ acres are to	
be under wheat, the seed-	
ing of which, at 1 bush-	
el per acre, and at 5s	
per bushel, * is	20 1 8
There remains for barley,	
oats, &c. 242 acres, part	
of which may be under	
lay clover, and part	
sown, which I shall state	
at 3s per acre for seed †	36 6 0
And 166 $\frac{1}{2}$ acres under	
common pasture, and	
meadow: and shall al-	
low 10s per acre on an	
average for dung, &c.	83 6 8
Remains 11 acres for tim-	
ber, &c.	

909 7 8

* 62 lib. of wheat per acre will be nearly 3 inches square, when properly divided. See *Rational Farmer* 2d. ed. p. 70.

† Which is sufficient when land is in prime tilth, and strength; as then, half the quantity that is commonly sown, will yield double increase.

The Farm Creditor, or increase Value by Corn.

	Brought over	909	7	8
One third continually under pasture and meadow, † viz. 166½ acres at 21 per acre		332	6	8
80½ acres, annually under wheat, at 32 bushels per acre, or 321 quarters, 2¾ bushels, at 11 12s 6d per quarter, and at 6l 10s per acre		522	3	4
Under barley, oats, &c. 242 acres at half value of a wheat acre, viz. 3l 5s		786	10	0
		<hr/>	1641	0 0
Profit of the farm as creditor		73	12	4
To maintaining the family, servants wages, utensils, &c.		400	0	0
		<hr/>		
Profit on the whole, net *		331	12	4

† In rotation.

* It might be objected by some, that such profit is too great, that the tenant's interest in it is double the landlord's. But in my opinion, it is not more than adequate to the expences and encouragement the tenant is intitled to, for the great trouble in reducing such land. Industrious tenants should always meet with encouragement. Besides, what man, equal to take such a farm, would burthen himself, with a task of this kind without something worth his while in view? and my reader must observe, that at the expiration of the first lease, viz. 50 years, the rent may be doubled, if it may be thought adviseable to give a lease of that length: as the land will, if properly managed, be

Note. The sum on the debtor side of 125 *l.* a year, goes to government, for rent; so that on the 4650 farms, a sum of 501,250 *l.* would be a yearly income to that branch,

And a sum of 7,630,650 *l.* would be the publick advantage, by the increase of so much value on the increased tillage.

Of CHACES.

The supposed number of acres under the denomination of chase-land, being, we are told, 13 in number, are 728,000, these being also divided into 500 acre farms would make 1456, and subdivided under the same denominations, as in the foregoing, may stand debtor, and creditor, the same, as in the two preceding pages.

Hence, a sum of 182,000 *l.* would arise to the proprietors of such chase-land, at a rental sum of 125 *l.* a year each farm. And a sum of 2,389,296 *l.* would arise to publick advantage, as before, by increase value of corn.

The gross divisions of the 728,000 acres of chase-land, are, under pasture 242,666. Under wheat 117,329. Under barley, oats, &c. 351,988, and under timber, and coppice, 16,016 acres, nearly. The same proportion as in the forest divisions.

Of as fruitful as at first. In respect to the Net profit on each farm, that sum will not appear exaggerated, when the manner, and small expence of cultivating it is considered; together with the quantity of grain it ought to produce.

Of Common HEATHS.

These are heathy wilds, a sort of common property affecting respective people bordering on such heaths, in various proportions, under a royalty or lord of the manor; which may be computed to contain 3,053,000 acres.

The present use of these Heaths, is, to keep a few ragged sheep in the summer; or breed a poor stunted sort of cattle, scarcely fit for the clothier or market; so that these 3,053,000 acres, are, acres to maintain poverty; and as such, are but nuisances to the public, as great part of those Heaths is good land for improvement, and the worst very reclaimable, so as to make one acre worth ten, in the present situation.

These 3,053,000 acres, being also divided into farms of 500 acres each, will amount to 6106, which are proposed to be leased out at 2 s. 6d. per acre, or 62 l. 10 s. per year, for 25 years. The Lord of the manor building convenient farm houses, &c. together with making enclosures, and dividing the fields; paying to those who have a right of commonage by way of purchase, such sum as 12 men on oath may award; or oblige such persons who have a right of commonage, to enclose their proportions as may be in the above manner awarded, with an obligation to break it up.

And it is not to be doubted, but at the expiration of such lease, each farm would be worth double such rent for 25 years longer. And at the latter expiration, namely, at the end

end of 50 years, be worth 10 s. *per* acre, or 250 l. a year, if properly husbanded.

I say, its value by good husbandry would be enhanced, nearly to the above proportion; it being quite a wrong notion that land will wear out. Land will never wear out, or be less productive, if justly dealt with; on the contrary, every year would add to its strength, as well as deepen its soil with riches; ever improving and producing. But this is not to be obtained in the common mode of horse-dung tillage; or by our common farmers, great or small: for they improve, and run out their land, without rest or change, knowing not how to support, or redeem its constitution, adding fuel to the fire, instead of quenching the flame.

The denominations at large, of these 3,053,000 acres must differ something from the foregoing, on account of keeping a proper number of sheep; tho I do not mean to exclude the farms of the forest or chaces from having sheep, such must depend on the various sort of land, &c. The denominations of the heathy farms, I state thus; under sheep pasture 610,600 acres. Common meadow and grazing 610,600 acres. Under barley, oats, &c. 1,221,200. Under wheat, 543,434. Under timber, coppice, &c. 67,166 acres; which quantities being reduced to each farm denomination, the numbers will stand:

To

To sheep pasture	100 acres.
Common meadow and grazing	100
Barley, oats, &c.	200
Wheat	89
Timber and coppice	11
	<hr/>
	500

Hence we may state these farms, as before,
debtor and creditor:

Heaths. The Farm Debtor.

Rent of 500 acres at 2s 6d	62	10	0
289 under tith, at 2l	578	10	0
100 of meadow and graz- ing, supposed to be at an expence of 10s per acre on an average of years for dung, &c.	50	0	0
89 bushels of seed wheat, at 5s per bushel, for 89 a- cres under wheat	22	5	0
To seeding 200 acres of barley, oats, &c at 3s per acre	30	0	0
Shepherd, hurdles, &c. for the flock, 100 for which 100 a- cres	20	0	0
11 Wood and coppice			
	<hr/>	<hr/>	<hr/>
500	762	15	0

The Farm Creditor, or increase Value.

100 acres under sheep pasture	100	0	0
100 acres pasture & meadow	200	0	0
89 acres wheat, at 29 bushels per acre, at 4s. $\frac{1}{2}$ d. per bushel, or 322 quarters, 5 bushels, at 11 12s 6d per quarter, being 51 17s 9 $\frac{1}{2}$ d per acre	524	5	3 $\frac{1}{2}$
200 acres under barley, oats, &c. at half value per acre of wheat viz. 2l 18s 10 $\frac{1}{2}$ d	588	15	0
11 acres timber and coppice			
<hr/> 500	<hr/>	<hr/>	<hr/>
Debtor	1413	0	3 $\frac{1}{2}$
	762	15	0
Produce Profit of the farm	650	5	3 $\frac{1}{2}$
Family expences, &c.	400	0	0
Net Profit	250	5	3 $\frac{1}{2}$

Hence, a sum of 378,603 *l.* would arise to the proprietors of such heathy land. And a sum of 8,627,873 *l.* 8 *s.* 1 *d.* halfpenny, yearly to the publick by increase value of corn.

In respect to the difference of profit between the forest, chaces, and heath farms, yearly,

yearly, viz. 81 l. 7 s. it must be noted, that the heath farms are to be completed by the landlord; and, the other farms to be built and kept in repair by the tenant, government allowing timber.

But as no exact number of acres are, or can be here set forth; so, neither can an account of debtor, and creditor, be exactly adjusted. All that can be meant by a scheme, and calculation of reducing these wilds into tillage, is to shew, and demonstrate that vast tracts of land now lie waste, and useless to the publick, which would, if thus noticed, be of the greatest relief and strengthening to England. It would at once relieve us from calamities, and make England, not in word only, but in deed the garden of the world.

Here I cannot avoid making a small digression, in order to remark to my reader, the situation of our tillage produce at November 1772, that after four years successive shortness of crops* we were reduced to such alarming symptoms, as to call down Royal recommendations, to prevent these threatening dangers. His Majesty told us in his speech that he was sorry to find that the late harvest had fallen short of giving such relief as was expected; recommending to parliament to take the dearth of provisions under their serious

* The produce of 1773, was no better, it making the fifth year.

serious consideration, that the poor might be relieved as far as human wisdom may direct. In consequence of which, the parliament passed " an act for allowing the importation of Wheat, Wheat flour, Rye, Rye meal, Barley, Barley meal, Oats, Oat meal, Pease, Beans, Tares, Callivancies, and all other sorts of pulse, from any part of Europe or Africa, into this kingdom, for a limited time, free of duty."

" And an act for allowing an importation of Wheat, Wheat flour, Indian corn, Indian meal, Biscuit, Pease, Beans, Tares, Callivancies, and all other sorts of pulse, from his Majesties colonies in America, into this kingdom, for a limited time, duty free." On the fourth of December received the royal assent.

And his Majesty, in his answer to the address of the house of commons, says, " the assurances you give me of your resolution to enter into the immediate consideration of the important affairs which I have recommended to you, afford me great satisfaction; and I have the fullest confidence, that you will endeavour, as far as lies in your power, to alleviate the distresses of my people, who are the constant objects of my care and affection."

How far this leave to import may affect the complaint, time only must tell us; a prohibition

bition of exportation of corn from England,* has been stopped since the year 1769.†

In what ever manner such act may alleviate a present complaint, it is certain, if such prohibition on export be continued, destruction must ensue; for if no permanent redress can be devised, and small crops of corn continue a year or two more, a momentary relief will only augment the distress: for as exportation of corn has been the support of our landed interest; so, importation continued, must be its ruin.

From hence, it seems evident, that in order to establish a better, and more solid security against this growing evil, reducing the forests, &c. into tillage, would at once provide the true means: It would also serve to ease the present worn out tillage land, as corn would undoubtedly become cheap again, through plenty, and thereby induce the farmer to rest part of his land, which on account of the high prices it has borne for some years past, he could not be prevailed on to do. Plenty would ever reign among us, and England would be, in reality, a land flowing with milk and honey.

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* Except under certain restrictions to our Sugar Colonies, &c. in the spring 1774.

† Rational Farmer. 2d. ed. p. 120 to 126.

*In respect to Government, by reducing the
FORESTS into Farms.*

As government ought and must support its rights and power; so, government giving up the Forests for publick good, has a right to retain such persons in power over the respective districts, as it has now in the present state of Forests. Such persons I shall therefore call Stewards, in lieu of Rangers, as persons appointed by Government to receive rents, and see proper clauses made in the respective leases, faithfully kept and fulfilled, at a salary of 1000 £. each per year; or in such proportion to each district as Government may think most adviseable. The yearly profit to Government will appear very considerable after the stewards salaries are deducted; namely, 514,250 pounds.

Yearly rent of 4650 Farms, derived	
from the Forests at 125 l.	581,250
To salary of 67 stewards, at 1000 l.	
each - - - - -	67,000
Net to Government yearly	£ 514,250

And in the course of 50 years, the length of the first lease, to a sum of 25,712,500 l. exclusive of the accumulating sums on each yearly sum, by interest on interest; from which at present not one penny goes to Government.

The

The increase of such tillage appears to be of the utmost consequence to the publick; as, the produce must make an almost inconceivable plenty, which in gross may be thus stated:

Forests. 4650 Farms.

To the yearly produce on each forest farm at 1641 l. see the farm ceditor p. 20.

7,630,650 0 0

Chaces. 1456 Farms.

To the yearly produce on each chace farm at 1641 l. the same as the forest farms

2,389,296 0 0

Com. Heaths. 6106 Farms.

To the yearly produce on each heath farm at 1413 l. 3 s. d. see p. 23.

8,627,800 1 6 1/2

Yearly advantage to the publick on the whole

18,647,746 1 6 1/2

In respect to the difference of profit to the tenant, between the Heath Farms and the two former, it must be noted, that the Heath Farms are to be completed by the landlord or proprietor, and the two former by the tenant; Government or the proprietor allowing timber for all the building purposes to complete every necessary convenience, as before mentioned; as also Government, or the proprietor,

proprietor, are to clear such land of all timber trees to their use, and the tenants, of all other sort of wood, to their use. To this I shall subjoin an average growth, consumption, &c. of Wheat, Barley, Oats, and Rye, yearly, in England, from the year 1697, to the year 1765, since which, to the year 1775, wheat has gradually decreased of such growth nearly 500,000 quarters: how the succeeding years may turn out, time must determine.

An account of the growth, consumption, export, and import, of corn as laid before Parliament in the year 1766; on an average of 68 years, namely, from 1697 to 1765, at which last period, it is computed there were 1,600,000 acres under wheat.

	Growth in quarters.	Consumption in quarters.	Exported in quarters.	Imported in quarters.
Wheat	4,050,771	3,840,000	216,771	—
Barley	4,603,272	4,433,125	170,147	—
Oats	4,240,947	4,252,725	—	11,778
Rye	1,063,652	1,030,000	33,652	—

As the number of acres under growth of wheat is computed to be 1,600,000, and in the year 1697 only 1,066,666 acres, the produce or yield per acre on the average number, viz. 1,333,333 acres, was 24 bushels, one peck, nearly.

This was a large average produce, considering, that during most of the above 68 years,

years, one half the acres were in common fields, where it is well known the land is not half tilled, nor half the produce from it as from inclosed fields.

We may justly conclude, that the inclosures produced, on an average, 32 bushels *per* acre, and the common fields 16 bushels; the latter, I am convinced, is too great an allowance, as is the former too little, since many acres of common field, to my knowledge, has not produced more than 8 bushels *per* acre of late years.

A general rule for inclosing and subdividing farms, in particular such as I have proposed to be obtained by reducing the forests, &c. is as follows:

A square space is the smallest expence in inclosing, and the greater such square, the expence is less, in a proportion of double the expence to four times the area so inclosed *. A square whose area is two acres, equal to 320 perches—by the table of calculation, you see, that the perches to surround such square is 71.52. And a square equal to 8 acres, or 1280 perches, takes but 143 perches to surround it, being only double the expence to 4 times the acres contained.

I advise that these farms be made into squares, as near as circumstances will admit,

G the

* Winter riches, p. 223, and more fully in a table of calculation in this treatise, p. 45.

the side of which square area of 500 acres will be 283 perch nearly, and the whole surrounding sides 3 miles and a half, and 12 perches nearly.

That this surrounding fence be a double ditch, either in wet or dry land, as such double ditch gives an advantage of having an ornamental row of trees surrounding each farm, by planting them on the top of the double ditch without injuring the fence, which all trees do that are planted in the row of quicks. This double ditch I propose should take up in breadth 25 feet; 6 feet of which to be the width of each ditch, and a space of 13 feet between, to contain the earth, and make a platform or terrace three feet six inches high, and nine feet in breadth at top; leaving six inches as a set-off * on each side on the thirteen feet breadth, which then will reduce the base of the platform to twelve feet broad, in the middle of which the ornamental row of trees are to be planted. The ditches are to be six feet broad at top, one foot six inches at bottom, and five feet in depth.

I recommend that two row of quicks be planted in each side of this raised bank, beginning with the first about six inches above the surface of the ground, with white thorn,

* The set-off is to prevent a weight being too near the face or slope of the ditch.

and

and the upper row crab-quicks, with a holly instead of a crab at every sixth quick.

Each side of this double ditch, the hedge should be cut or clipped every year, to the height of five feet above the top of the bank that might be so raised, leaving here and there a white thorn and crab to grow up as standards; the outside of which hedge to be cut perpendicular, and the inside, from four feet high, sloped outwards, to prevent a disagreeable flat top.

In the middle of this raised bank, which is nine feet in breadth at top, plant a row of English elms, the fourth sort mentioned in *Miller's Dictionary*, at forty feet distance from each other: the gross branches of every other tree, as they advance in height, may be lopped off for the use of the farm; the branches of the others are not to be cut on any account above twenty feet high, to which height the small branches are to be cut off at all times before they grow to one inch diameter. By this means one half of the trees will be uninjured in their timber; and the other half will provide loppings, together with the coppice-wood, sufficient for the farm use.

Dividing

Dividing the Farms into Fields.

For tillage, 7 fields, at	
20 acres each,	140 acres.
3 Fields, at 14 acres each,	42
14 Ditto, at 10 acres each,	140
	-----322
Under pasture, common	
meadow, house, &c.	167
Under timber, and cop-	
pice,	11

	500 acres.

In order to make the difference of expence, in inclosing small or large fields, fully appear at one view, I have, as follows, given a table of calculation ;

A TABLE

A TABLE of CALCULATION, *shewing the Difference of Expence between Inclosing Large or Small Fields proportionably.*

Acres inclosed in a Square.		Perches contained in each Square.	Side, or Root of each Square in Perches and parts.	Expence, or Charge of Inclosing each Square, at 1 s. per Perch.			
Acres.	Perches.	Per. Part.	L.	s.	d.	grs.	Par.
1	160	12.64	0	12	7	2.72	
2	320	17.88	0	17	10	2.24	
3	480	21.91	1	1	10	3.68	
4	640	25.29	1	5	3	1.92	
5	800	28.28	1	8	3	1.44	
6	960	30.98	1	10	11	3.4	
7	1120	33.46	1	13	5	2.8	
8	1280	35.77	1	15	9	0.96	
9	1440	37.94	1	17	11	1.12	
10	1600	40.0	2	0	0	0.0	
11	1760	41.95	2	1	11	1.60	
12	1920	43.81	2	3	9	2.88	
13	2080	45.67	2	5	8	0.16	
14	2240	47.32	2	7	3	3.36	
15	2400	48.98	2	8	11	3.4	
16	2560	50.59	2	10	7	0.32	
17	2720	52.15	2	12	1	3.20	
18	2880	53.66	2	13	7	3.68	
19	3040	55.13	2	15	1	2.24	
20	3200	56.56	2	16	6	2.88	

Acres.

Acres.	Perches.	Per. Part.	L.	s.	d.	qrs.	Par.
25	4000	63.24	3	3	2	3.52	
30	4800	69.28	3	9	3	1.44	
35	5600	74.83	3	14	9	3.84	
40	6400	80. 04	4	0	0	0. 0	
45	7200	84.85	4	4	10	0.80	
50	8000	89.44	4	9	5	1.12	
55	8800	93.90	4	13	10	3.20	
60	9600	98.52	4	18	6	0.96	
65	10400	101.98	5	1	11	3. 4	
70	11200	105.83	5	5	9	3.84	
75	12000	109.54	5	9	6	2.32	
80	12800	113.13	5	13	1	2.24	
85	13600	116.61	5	16	7	1.28	
90	14400	120. 06	6	0	0	0. 0	
95	15200	123.28	6	3	3	1.44	
100	16000	126.49	6	6	5	1.52	

Hence, as before observed, the expence is only double to quadruple the land inclosed ; that is, it will cost 12 s. 7 d. 2 farth. and a small fraction, to inclose one acre ; and the expence of inclosing four acres is but double that sum.

The difference of expence between inclosing a parallelogram and a square, under equal areas, will appear much in favour of the latter : Also, the nearer a parallelogram approach a square, less the expence of such inclosure. *

It

* Vide Winter Riches, p. 221.

It follows likewise, that the same proportion holds good in loss of land, keeping such fences in repair, and harbouring of birds; which latter is in many places not less than half a bushel *per* acre; half of which is a loss to the kingdom of 50,000 quarters of wheat yearly, equal to a sum of 81,250 l. at 1 l. 12 s. 6 d. *per* quarter---a great loss indeed!

The interior inclosures I shall recommend to be divided by small double ditches, four feet in breadth, by three feet deep, with one row of white thorn quicks planted on each side, and a row of crab-quicks planted on the top, with a holly, instead of a quick, at every two feet distance.

This method of subdividing may appear to be something more expensive, than with a single ditch of five and six feet; but when we consider that a vacuum of six feet broad, by five feet in depth, and one foot six inches broad at bottom, measures thirty-six feet six inches in solid; at one foot in length; and a vacuum four feet broad at top, three feet deep, and one foot in breadth at bottom, and one foot in length, measures only nine feet nine inches, that appearance of expence will fall on the six and five-feet ditch, nearly double to the other two.

I must also observe, that there are but few soils that will permit or support a weighty bank of earth; as all ditches being not only conveyances

conveyances for water, but are also receptacles of the water filtered through its sides, which oozing, or filtrarion, softens such face of the ditch, by which, with its mouldering away, the weighty top soon slides into the ditch; which can scarcely be again ever made perfect.

In dry, shallow, gravelly land, a deep ditch is equally subject to fail; and, though not so often liable to moulder and waste in its sides as in wet soils, yet a dry or frosty air, with the usual changes of weather, renders this also open texture subject to a perpetual mouldering.

In these subdivisions it would be very ornamental, if a few low growing trees, such as the laburnum, the quicken or mountain ash, with a crab-tree and white thorn, trained up for that purpose, at thirty feet distance, were introduced into the fence, being set in an alternate manner, with a honeysuckle to each; and, if tillage land, the hedge should be kept to four and half feet high from the top of the bank. If it be pasture land, the hedges should be permitted to grow to any height, and the sides cut up as high as a man can reach, with a hooked instrument fixed to a stick for that purpose, but no timber, or very high-growing tree, should ever be permitted in any such fence. Corn should have an open exposure, and grazing, or pasture land, should be sheltered

tered with high hedges, but no trees in the hedge-row of the field division.

To reduce Forests, &c. into Tillage.

To lay down a rule for reducing all the variety of soils that must be met with in so large a scope as the forests in England, would be unnecessary; I shall therefore confine myself to two sorts, namely, such land as is clear from bushes, and such as may be found much incumbered with them, brambles, &c. proposing the farmers toil to begin in October 1776, or any other year, on the first-mentioned sort; where, if a few briars should incommode, they may be cut away, the roots of which will not in the least hinder a sharp tined scarificator * from going one way, and then cross-cutting it at the other; which, when done, it will be proper to break up the ground with a plough, and two yokes of oxen. In this state let it lye, till the first dry weather that may offer in March 1777, then drag-harrow it, and sow pease. † When these are ripe, and the field cleared, spike-roll ‡ the ground; the teeth or spikes of which being seven inch-

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* See its description, *Rational Farmer*, second edition, p. 15.

† Pease are a great meliorator of strong soil.

‡ See the Frontispiece *Rational Farmer*.

es long, will loosen the soil to that depth; then, with one yoke of oxen, * and a swing of a Norfolk plough, plough not less than an acre a day.

In such rough state as the plough may leave it, let it lye two months, then drag-harrow it, roll and plough it up again, and let it lye till the end of October; then drag-harrow it well, and sow it under furrow with a one-horse plough, sixty-four pounds of wheat to one acre; and, if it should be of an open texture, pen it with sheep as soon as sowed, which will enrich the land, as well as prove the means of preventing the worm from injuring the wheat, † by closing its pores, and making it of a more hard and solid texture.

Leaving this part of tillage till April ‡ following, 1778, I shall return to direct the preparation of some other part of the land for potatoes, namely, such as may be incumbered with bushes, &c. more than the former.

Here the heavy tedious plough should be avoided, as well as many expensive horses, by cutting away the bushes, and stubbing up the larger trees, and such roots only as may be in the spaces between the beds. After the land may be thus cleared, lay it out into seven-feet
beds

* Eight or nine hundred weight.

† The red or chesnut worm much infests such land.

‡ At which time sow red clover or trefoil in the wheat, for an after-feed for sheep.

beds in breadth, and a three-foot space or alley between.

On these seven-feet beds, lay a pretty thick covering of dung, or furze cut small, on which, in March following, 1777, lay the potatoes at one foot distance, covering them with the earth in the alleys, and as soon as they begin to appear, lay on another small covering from the alleys; after which nothing more needs be done till the time of digging out the potatoes, unless thistles, &c. should spring up among them, which must be weeded out.

In the interim between sowing pease, planting potatoes, &c. in the spring 1777, and the ensuing harvest, I shall recommend to the farmer to be busy in making drains where the land may be wet; these drains may be filled with stones, or black thorn; if the latter, the best way is to make them into small bavons, and tread them close, leaving a foot at top unfilled for earth, that the plough may not touch the drain.

In this interim also, some other parts, where bushes are thin and weak, may be preparing, by clearing such away, and ploughing it up; at which time rape may be sowed for an early feed for sheep; or in June it may be sowed with the same, or turnips; either of which may be pen fed off in August, and immediately

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The first of these is going on under its crop of wheat just sown; in respect to the second, viz. under potatoes, these must be now dug up, and preserved for sale, or sold by the perch or acre in the ground. This sort of culture will pay very well, in respect to bringing in such land fit for tillage, as also profit: In respect to tillage, it is the shortest way to reduce such sort of woody land; as, without stubbing up those small roots, they in general are destroyed by the dung used in the culture of the potatoes, being reduced or putrified in the space of a few months, from the nature

in which time tape may be blown for an early

* If the sod or first surface should be found not sufficiently rotted, let it lye under a veer and ridge winter-fallow, (see Winter Riches, p. 33-) and sow it in the spring 1778, with barley and red clover, at the rate of two bushels of barley an acre.

of the dung; which roots much enrich the soil also.

At the same time that such land is preparing for corn, it also brings in a considerable profit.

I just before directed to plant the potatoes at one foot distance; but I will suppose them to be planted in these beds, in such land, only three rows in the breadth of seven feet, and two feet distance in the rows; this distance will make 990 in each bed, of forty perches in length, and, supposing these plants produce but three pound and an half weight on an average, the weight will be 3465 pound to each bed; and there being seven of these beds in the breadth of four perches, * the weight on the whole will be found to be 24,255 pound, or ten ton sixteen hundred and an half nearly, equal to 433 bushels, which, at 1 s. *per* bushel, or 40 s. *per* ton, amounts to 21 l. 13 s. *per* acre; † from which, deducting

* Four perches in breadth, and forty in length, is one acre.

† We are told that in May 1773, two potatoes were divided and planted in the garden of Gilbert Cooper, Esq. in Cheshire, which produced in November following 512 pound weight. And at Castle Cary 1773, thirty acres of fern and rubbish land was let from Lady Day to Michaelmas, at 3 l. 10 s. an acre, to some potatoe planters, which produced 3600 sacks, or 360 ton, being twelve ton, or 120 sacks an acre, which sold at 5 s. a sack, being at

ing 4l. 13s. 4d. at the rate of four pence *per* perch on each bed in length, for planting them, and the same for digging them up, making 9l. 6s. 8d. there will remain 12l. 8s. 4d. clear profit, *per* acre. The wood, &c. taken, or cut off such land, will fully pay for stubbing out the roots in the alleys, or three feet spaces between the beds.

Lastly, the third, or a later preparation than either of the former, having had rape, turnips, &c. sown in it, and penned off with sheep, being at this time, September, or October 1775, sown with wheat, or left for a year and ridge winter fallow, comes next under consideration.

If with wheat, I shall advise that not more than sixty-four pounds be sown *per* acre; observing, that if the ground be light, tread or rather pen on it with a heavy fold of sheep, as soon as it may be sown, to prevent the wheat-worm from injuring it; * and it will be still safer, if, by examining the earth, it appears that there are many of those worms, † not to plough such light land, until it be well soaked with rain, and even then it cannot be injured by penning; for the more solid, light land

at the rate of 30l. an acre. And after Michaelmas was sown with wheat. Note, The Surinam potatoe, see account of, at the end of this book.

* See p. 50.

† See Winter Riches, p. 157.

land can be made, the greater the probability of a good crop. †

If, on the contrary, the land should be of a strong nature, and sown with wheat at this season, let it lye rough after the harrow, and in March following bush-harrow it over, as soon as the red clover seed may have been sown; this loosens the surface of such binding land, and creates a nourishment to the plants, by such clods being pulverised.

Clover or trefoil may also be sown in the spring with pease, and it often happens to take much better than with barley. I therefore recommend red clover, &c. to be always sown in wheat-land in the spring, or with pease, as well as with oats or barley.

But if such land, as well as the potatoe part before-mentioned, should not be reduced sufficiently for wheat within the time, it will, after a winter fallow, be in prime condition for a spring crop; after which a rotation of corn, ‡ feeds, § and food for rearing and fattening the cattle, || will naturally ensue, observing, that whenever summer crops are designed to pen-feed sheep on, they must be sown

† Also roll such land well in March following.

‡ Section third, p. 13. winter riches. Rational Farmer, second edition, p. 54.

§ Winter Riches, p. 199.

|| Ditto, p. 42, 48 to 52. Rational Farmer, second edition, p. 39.

sown thick, as such are not to be hoed, or set out at distances, unless turnips or rape that are to stand till the end of November, &c. sheep ought to be penned twice in the twenty-four hours, during the summer, till Michaelmas;* not letting them out of the same field, they have been penned on either in winter or summer, unless it be to manure or tread hard, light wheat land, as before mentioned, or some poor land, &c. in the latter case, it would be well to carry turnips, and feed the sheep thereon.

By such alternate, cheap, and profitable manurings with dung of high-fed sheep, hogs †, or vegetables ploughed in, in their profusion of oleose juice, will the land be brought into such a state of profit to the husbandman, as Cato gave in answer, on being asked, what was the most assured profit rising out of land? "To feed cattle well," said he: and being again asked, What was the next? "Marry, to feed in a mean," which seems, as Pliny observes, "That the most sure and certain profit was that which would cost least." ‡

On

* Above all things, avoid the base custom of dragging out the small dirty part of the turnip, which the sheep refuses; it is cruel to oblige them to eat through necessity of hunger, those dirty parts, with tender teeth: but save that labour and barbarity, by ploughing in such to enrich the soil.

† See Rational Farmer, second edition, p. 39, &c.

‡ I flatter myself, that the system adopted in this treatise will be found to answer this just remark of Cato's, as explained

On Early Reaping.

As early sowing is the most probable method of procuring early gathering, so cutting such corn, before the farmer's accustomed time of what he calls ripe, has these two advantages, namely, giving him an opportunity of much sooner gathering in the fruits of the earth, thereby gaining so much time before the declining days advance too far; and, secondly,

explained by Pliny, namely, in cheapness of cultivating land; as well as it has agreed with so many indisputable authorities in the manuring part: and it is to be hoped, that it will also take place in a larger extent, in the new little world's of forests, &c. (proposed to be inhabited with the most discerning cultivators) than it can among the old habituated. Every unprejudiced man sees the melancholy situation of the present worn-out land, (which, by their injudicious cultivating weeds, with the baneful seeded dung, and eating out its substance with unremitting crops) common weeds, dog-grass, matted in the earth like the clotted hair of their own heads, is now the principle produce, together with robbing the land of a large quantity of its earth, in so basely carrying it away, when thus dragged up together, and no proper restorative administered, is the cause of its producing poor crops of corn. Farther improvements on husbandry is most certainly to be obtained, as well as much wanted: the writer of the Political Survey of Great Britain, observes, "When gentlemen of large fortune in this country came to lay out gardens and plantations, they find no difficulty insuperable; and no doubt with equal skill, application, and diligence, more material and extensive improvements in husbandry might be likewise made."

condly, the surest way to have the finest coloured and largest grain: there are too many instances of the loss of corn, * by shedding, (as the farmer calls it) where it is ripe, which is also as well known to them, to be the finest and largest of the corn. And it is sufficiently known to many of them also, that cutting it earlier than the accustomed time, is every way advantageous; the only reason why the latter is not practised, seems to be that they are accustomed farmers, and not experimental pursuing husbandmen!

Pliny observes, “ That many make haste,
“ and put their seed into the ground, having
“ this proverb, over-timely and hasty sowing
“ oftentimes fail; but late sowing shall ever
“ miss, and deceive the master.”

So well were the ancients acquainted with every part of the first principles of that noble science, Agriculture, that there is not any good rule that was not in some measure known to most of them. Pliny also observes, “ The
“ sooner that corn is cut down, the fairer,
“ and the more full and weighty is the grain.
“ The best rule is, to cut it down before
“ the corn be very hard, and when it begins
“ once to look of a ruflet colour, and to have

* Particularly the rough hulled, which is one of the best sorts of wheat; barley, indeed, must be fully ripe before it be cut, as it has not, like other grain, any husk, covering, or pod to feed on, when cut down.

“ a brown and reddish cast. And here re-
 “ member the old saying, that may go well
 “ for an oracle, Better two days too soon,
 “ than as many too late.”

Thus, by early sowing, early harvests en-
 sue; the good husbandman will never lose
 a moment's time in the succession of his la-
 bour; always taking time by the fore-lock,
 looking forward into the benevolent earth,
 that is so willing to bring forth plentifully,
 and in due time, when early replenished with
 refreshment and seed.

Observing nature, is ever the part of a good
 husbandman's occupation; as it is infinite, so
 it is instructing and useful. The variety of
 herbs, flowers, trees, and fruits; their odour,
 colour, and multitude; the same juice diver-
 sified, by the various organs in plants; their
 virtues and properties arising from one com-
 mon mother, one would think sufficient to
 animate a husbandman, and make him join in
 sentiments with an ancient writer, who says,
 “ That the earth, our common mother, should
 “ be assisted against the false imputations of
 “ ungrateful man, who is daily charging her
 “ with his own faults, when it is man, ob-
 “ stinate man alone, that is blameable.” *

Thus, the renowned C. Plinius Secundus,
 when treating of corn, says, “ Very well &
 “ may

* This was one of Pliny's observations.

“ may take in hand the cause of this earth,
 “ the common mother of us all. Set case she
 “ has brought forth poison and venom; who
 “ hath searched them out but man? As for
 “ the fowls of the air, and wild beasts, it is
 “ sufficient that they touch them not; nay,
 “ they know how to beware, and avoid them.
 “ For say, that the elephants do file their
 “ teeth sharp against hard trees; say, that the
 “ rhinoceros whets his horns against the
 “ rocks, and the wild boars sharpen their ed-
 “ ged tusks against both stock and stone;
 “ say, that all creatures know well enough
 “ how to prepare and furbish their weapons
 “ to do mischief, which of them all yet in-
 “ fects them with poison, but man alone?
 “ We have the art to in venom and poison ar-
 “ rows; we can tell how to put something
 “ to our darts of iron and steel, more hurt-
 “ ful and mischievous than they are; it is
 “ ordinary with us to poison rivers also; yea,
 “ the very elements whereof the world doth
 “ stand, are by us infected: for even the air
 “ itself, wherein and whereby all things
 “ should live, we corrupt to their mischief
 “ and destruction. Neither can we truly say
 “ or think, that other creatures, besides us,
 “ are ignorant of these poisons, for we have
 “ already shewed, that they are not to seek
 “ either what defences to provide against they
 “ should fight with serpents, or what reme-
 “ dy

" dy to find for their cure, after they had
 " fought and are hurt. Moreover, setting
 " man aside, there is no creature furnished or
 " armed with any other venom but its own.
 " We cannot chuse, therefore, but confess
 " our great fault and deadly malice, in that
 " we rest not contented with natural poisons,
 " but betake ourselves to many mixtures and
 " compositions, artificially made, even with
 " our hands. Neither do these monstrous
 " and abominable spirits know any other re-
 " ward of this their deadly breath; their cur-
 " sed and detestable malice, but to hate and
 " abhor all things. Yet herein we may ac-
 " knowledge and see the wonderful majesty
 " of Dame Nature, for like as she hath shew-
 " ed herself more fruitful and liberal in bring-
 " ing forth profitable and wholesome plants,
 " in greater plenty than the hurtful and noi-
 " some, so surely hath she furnished the world
 " better with good men, and virtuous, for the
 " public weal."

What a field of parities are here exempli-
 fied against man! Every creature, but man,
 acting for its own defence and preservation,
 from merely its own natural instinct; but
 man, from his own corrupt mishappenings,
 immediately charges the earth with cruelty,
 and false imputations—himself, at the same
 time, being the offender, by poisonous com-
 positions, and unskilful management.

Are

Are not our common farmers possessed with such a spirit of obstinacy against every instruction, experiment, and even conviction? This benevolent earth that they thus traduce, that never-removed stratum, under the common-trampled furrow, though often the best, yet is not to be touched; even the least part of such being turned up accidentally with the plough, frightens the farmer. But Virgil says, "Then let my bullock begin to groan with ploughing deep, and let the share be worn bright with the furrow." * And Mr. Lawrence recommends such earth as the best for amendment and improvement. "Such as where neither spade nor plough has reached; and that no kind of compost made with art exceeds it." Adding, "That if the choicest fruit trees be planted therein, they presently discover an uncommon healthfulness and vigour."

How easy and rational it is to account for this assertion! Even the objecting farmer, would he but allow himself to reason on it, must surely be convinced of its truth. Does he not know, that, by often ploughing, the pores of the earth are more and more opened, thereby receiving the nourishing nitre of the

* Winter Riches, p. 89. Note, Virgil was not afraid of going deep into a sharp soil, when he said, "And let the share be worn bright with the furrow."

the sun, air, and water, * together with aiding manures from the master's diligence!

All these daily filtering through the loosened upper stratum, must sink into the next, beneath which it greatly enriches, though not so much discoloured as the upper, having not been exposed to the air; and the third stratum will in general be found still less discoloured than the second, where land has been long tilled, and manured, as less of such manuring reaches it.

The second stratum, because it is not of so dark a colour as the first, frightens the timorous farmer, whenever he sees any of it exposed, by accidentally going a little deeper than is common. But let me tell him, that if such despised colour became exposed to the air, and sun, it would soon wear the same countenance with the first. † Does he know what gives the ploughman, haymaker, and country wench a deeper hue than miss, who attends her toilette or side-board Mr. Harry? Must he not own, that it is because the former expose themselves to the genial sun, and health-giving air, ‡ from which the latter screen themselves, and thence derive their insipid complexions.

On

* See Winter Riches, p. 88, 89.

† See Dechateauvieux's opinion, Winter Riches, p. 89.

‡ The principals in promoting and perfecting nature, without plenty of which, both the animal and vegetable parts of the creation always look wan.

On the Choice of Wheat, &c. for Seed.

In chusing seed, of all sorts of grain, it may not be improper to acquaint the farmer, who is too often neglectful in this part of his profession, that much depends on changing corn, as well as the quality of such. Many are so neglectful in this necessary part of good husbandry, as often almost to destroy the quality and quantity; nay, even the very land in which it is sown, is rendered barren, or produces nothing but weeds, and then the land, season, &c. is blamed.

I would therefore most earnestly recommend the farmer to be strenuous in changing his seed from sandy, to a strong loam, and, from loam to a sandy soil; that is, from light to heavy, and from heavy to light land, every other year.*

In respect to the quality of seed, this is as necessary to be attended to as the change. In general, the largest and finest wheat grows on strong land; yet such is sometimes produced also by a lighter soil.† However, though heavy land requires more labour to till it than light land, yet the crop generally makes amends. Here I cannot avoid mentioning an observation

* Winter Riches, p. 199.

† Rational Farmer, second edition, p. 79.

observation of Pliny, "Howbeit," says he, "the ground that is thus churlish to be husbanded, is not always bad for increase." An instance of which the same author mentions in this manner: "In Byzacium, a territory of Africa, there is not a better and more fruitful piece of ground lieth without door than it is, yielding ordinarily 150 fold: let the season be dry, the strongest team of oxen that is cannot plough it: fall there once a good ground shower, one poor ass, with the help of a silly old woman drawing the plough-share at another side, will be able to go round with it, as I myself have seen many a time."

I have heard a farmer, who was the oracle of his little neighbourhood, say, that small grained wheat was better than large for seed, without any exception, as there were more grains to the bushel.

Good wheat of the growth of a light soil, will in general be a smaller grain, than good wheat on a heavy soil; and therefore, when seed is changed to answer the change of soil, the light land may have a larger grain for its seed, from the heavy soil, than the heavy land may have from a light soil. In this case a smaller seed must take place, and being the best in its kind, will improve, on being changed

• A great error,

ged from a light to a stronger soil. In the opposite case, although wheat be changed from a strong to a light soil,* the largeness of the seed-grain will enable such soil to support it profitably for a year or two, but not more; because the lighter the soil is, the sooner will wheat degenerate.

The choice of small-grain'd wheat for seed, is diametrically opposite to true principles, and shews an error in two cases; first, the error in sowing too thick is hereby cultivated; and secondly, that a small grain is better than the more powerfully fed corn. †

Virgil says, " I have seen some meditate
 " their seed before they sow; and steep them
 " in nitre and black lees of oil, to cause a
 " fuller produce in the deceitful pods. And,
 " though they have been moistened over a
 " gentle fire to quicken them, and long tried
 " and examined with much labour, yet I
 " have seen them degenerate, unless a man
 " picked out the largest of them, one by one,
 " every year. Thus, every thing by fate de-
 " generates, and runs backwards; just as when
 " any one is rowing with difficulty against the
 " tide, if he happens to slacken his arms,
 " immedi-

* That is, from a strong loam to light earth.

† This is a great mistake, both in respect to quantity, as well as in quality; for, as given quantities are lighter or heavier, so the quality diminishes, or increaseth, in the same proportion.

“ immediately the tide drives him head-long
 “ down the stream.” †

This excellent Georgick also recommends sowing wheat early; his words are, “ Plough
 “ naked, and sow naked; winter is a time of
 “ labour for the husbandman. In cold wea-
 “ ther the farmers generally enjoy what they
 “ have gotten, and, rejoicing one with the
 “ other, make mutual feasts.”

Having urged the necessity of guarding against bad seed wheat, as also to carefully steep seed-wheat in proper lixiviums, in the *Rational Farmer*, *Winter Riches*, and as before recited; yet I think the following experiment may also be admitted, as a stimulating circumstance to the farmer.

I was told that much barley would grow, after it had went through the regular process of malting; on which I asked a malster's opinion; his answer was, that he had heard the same asserted, but was very sure that he could pick out some grains that would not grow, and gave me twenty-eight malted grains as such. These grains I put into the ground, at six inches distance, seven of them vegetated in some degree; two of which strongly in root and blade, two more in a less degree of strength, another still weaker, and the other two

† How different this from those who never steep, or change their seed; nay, even sow it foul besides,

two very weak. I waited a fortnight after the first-mentioned had been out of ground three weeks, and then took them all up, and found that twenty-one grains were rotten, and the other seven as followeth: two strong in roots, and well bladed above ground; two more with weaker roots sprung out of about half the end of the grain, the other half end decayed, and the blade had just pierced through the earth; one more weaker both in root and blade than the latter two, and appeared to be more putrified in the grain; the other two had only one very weak root to each, and just an appearance of a blade only.

The result of this simple experiment indicates to us, that, as grain may be more or less strong in its vegetating parts, so the plant from such will be affected. For there can be no doubt but, as the imperfect grain may be either before it be sown, or damaged afterwards in the earth, so will imperfections be in the plant, and of course affect the corn, in the same proportion. The manner how barley vegetates in the grain, differing from every other sort, happened to be the best for the present purpose; all other sorts of grain produceth its root and blade from one end of the grain only, but barley produceth its roots from the thick end of the grain, and the blade from the small end; which shewed the imperfec-

tions

tions in the respective grains, more than could be seen in any of the other sorts of corn.

Of CHACES. How to reduce them into Tillage.

Reducing the chace-farms into tillage, requires in general a different manner of proceeding, from that of the forest-farms, as such land is more light, and more inclinable to fern.

Such land I shall recommend to be broken up with a circular coulter * to the plough, instead of the common coulter, the beginning of July, in the midst of the fern's vigour; which is to be ploughed in, by first rolling it regularly with a heavy roller, and then plough it into ridges, in the same direction or lay of the fern, with a broad Norfolk share, † which will cut the bottom part of the roots, and thereby give an easy subversion to the furrow. ‡ The coulter for this purpose should be ten inches in height, as the depth to be ploughed ought to be eight or nine inches, notwithstanding its shallow soil.

On

* See Frontispiece.

† See frontispiece Rational Farmer.

‡ The quantity of green Fern thus ploughed in, with the rotting sod, will be a large enrichment to that part of the first stratum.

On this upper part of the first turned furrow, it will be proper to lay three bushels of unslacked lime to every perch; spread and harrow it well; or, if lime be difficult to be obtained, have ready prepared a quantity of charred clay, † and blend that well with the surface of such furrow; § on either of which immediately sow turnip-seed, which, winter pen-feed off, and in the spring following sow it with barley, in the proportion of two bushels an acre, seeded with red clover; after which wheat may be sown, as has been before directed, and the before-mentioned proceedings observed in their rotation.

But if it be found more convenient to break up during the winter, or early in the spring, * instead of the summer, as first mentioned, I would advise the farmer to sow it with a thick crop of buck-wheat in April, and, as soon as it comes into blossom, roll it with a heavy roller, and plough it in, in the same manner as just directed in the case of the fern.

As

† See Rational Farmer, p. 27 to 29, second edition.

§ This will effectually enrich the other part of the first stratum.

* At either of which scarify the land, first with the scarificator, an utensil in husbandry, to cut five or six inches deep, at four inches distance, and five or seven of these cuts in breadth, according as it may be constructed; observing further, that either stone or clay marl is a good manure for this sort of land.

As soon as such buck-wheat may have been ploughed in, on that surface sow turnips, without any other preparation than a harrow; these turnips may be fit to be pen-fed off in September or October at farthest, and then sown with wheat; after which the consequent judicious proceedings will naturally succeed, when the farm is in the hands of a good husbandman.

If any part of such farm should prove cold, and heavy, which there is no doubt but abundance of it will, then such must be managed, as has been directed in the case of strong land in the forest farms, and elsewhere spoken of.

Of Common Heaths.

The soil of common heaths being nearly the same as the first-mentioned in the chase-farms, may be treated in the same manner, except where heath interferes, which, in July at a dry time, when the ground is even parched with heat, may be set on fire standing, the ashes of which will help the land; and the fire will burn and injure the crown of the roots, so as to cause them to rot or decay the sooner, by destroying their growing qualities.

Then, with a strong sharp-tined scarificator, score the ground first one way, and afterwards across,

aerols, which will cut and separate the tough roots, so as to make the entangled earth an easy conquest to a plough, whose share and coulter are well steered, and well sharpened.

If clay or stone marls,* or lime be convenient, or even to be obtained at a reasonable rate, either of them may be applied; but if such cannot be procured, then you have my vegetable system to apply to, which is in the power of every man.†

Thus the present poor despised land, may soon be brought to a rich and fertile countenance; and, instead of barren heath, produce the golden grain.

Perhaps I may be told, that such work cannot be done so easily; that writing and doing are different things. So say I, for I am very sure, that writing and instructions will never prevail on the opinionated, nor convince the obstinate.

Let the idle perverse man examine into the golden age of old, where the attention of a good husbandman was such, as never to lose one night's penning of his sheep: if he had not land ready for that purpose, he put his sheep into a confined place, with litter or straw strewed under them. Attend to the pre-
cious

* If stone marl, let it be reduced very small, before it be laid on the lands.

† See Rational Farmer, and Winter Riches, together with various instructions in this treatise.

cious advice of Cato: "Weed out of the
 "standing corn wall-wort or dwarf-elder,
 "hemlock, thistles, &c. from your ofier-
 "plots, pluck up your rank weeds; also ga-
 "ther reek or sea-weed, and dead leaves and
 "branches lying rotten under trees; when
 "thou hast done, strew, and lay a course of
 "them under sheep, when they are folded."

This is a lesson of industry worthy to
 be written in letters of gold; a piece of
 husbandry which will procure a good
 tiller of land the title he ought to have,
 namely, that of an Husbandman.* And,
 agreeable to that of Cato's advice, is that al-
 so of Pliny, who says, "That each sheep
 "well littered, would make a load of dung
 "every ten days."

I heartily wish, that every man who calls
 himself a Farmer, would become a Hus-
 bandman in reality; that he would merit that
 high praise and title which the Romans be-
 stowed, as the greatest honour to a deserving
 man.†

L

Navew.

* I have elsewhere observed, that a good husbandman
 may be a farmer, but that there are but few farmers that
 are husbandmen.

† The plough of such ought to be called, the *plough*
laurent.

Navew, White and Black-rooted.

I much wonder that this sort of turnip has not been introduced into England amongst the farmers, since its use is so well known. It is called *Napus* in Latin, *Navew*, or French turnip. Mr. Miller refers *Navew*, Rape, or Cole, to the title of *Napus*, all being of the same species. There are three species of navew; garden-navew, with a white root; garden navew, with a black root; and wild navew; this last is what we call rape, or cole. The two first is cultivated in France, Germany, and Italy. This root has a warmer taste than turnips, and is accounted a more delicious food: it is cultivated for sheep in the same manner as turnips.

Pliny says, navew is a species of base or wild turnip, is very useful for cattle; that they eat it with great delight, and fatten well on it; that the root will keep almost the whole summer, if taken care of in a house, and that it will grow any where; that after their vintage-harvest is over in Italy, they call the taking up the roots to keep during the winter, a second harvest, particularly beyond the Po, in Piedmont, Lombardy, &c. and observe that the roots often weigh forty pounds.

By

By these accounts it seems very clear, that mavev is equal, if not superior, to turnips, or either of the turnip rooted kind for sheep; as they keep longer, are a warmer food, and large size; and equally as proper a vegetable to be ploughed in for manure as any other.

Of Manures, natural and artificial.

I shall now give a short detail of manures, by which the occupier of any of those new reduced farms, may be always enabled to furnish himself with from one or the other. These I shall rank under three denominations, viz. natural manures; artificial manures; and natural green vegetable manures.

First then, natural manures are clay, marles of all kinds, sea sand, lime stone, gravel, &c. and all such solid substances as have not gone through any artificial process to change their quality.

Secondly, I call these artificial manures, that have gone through a process to change their quality, such are clay calcined, lime, salt, foot, dung of fowls, neat's dung, sheep dung, hog's dung, horse dung, soaper's waste, or ashes, weeds calcined, &c.

Thirdly, the natural green vegetable manures are, sea-weeds, leaves of trees, lupines, beans, vetches, clover, buck-wheat, turnips, &c.

&c. or all such vegetables that has not been fermented, by passing through the body of man or beast; to which may be added, horn-shavings, and hair of beasts. All these may be truly called, the essence of manures.

Of Manure natural. And first of Clay.

This is a body of earth more compact than any other, whose pores being close, the salts that are contained in it, are not so easily diffused towards nourishing the tender fibre, as a more porous body, though much more in quantity.

The salts contained in clay, are in proportion to other earths, as two to one, viz. there are more salts in one pound weight of clay, than in two pounds weight of any other earth, * or loam.

This rich compact body, however crude in its fixed state, if well tilled, is the surest friend to the farmer; and also as manure to light, sandy land, whose texture is too loose, and pores too open to retain moisture, or preserve its few salts, when united with a more compact body, † such light soil becomes permanent,

* Mr. Miller.

† Such as clay.

manent, each acting on the other, so as to make a good medium.

For, as sandy land is quick in its operation, the salts are sooner exhausted; while clay, being slow and compact, and of a nature to retain its salts, prevents the lighty sandy soil from losing its salts, as well as adding more to it in the proportion before-mentioned.

Thus the operation of these two opposite bodies united, shews the principles on which the contrasting of opposites are founded,

Secondly, Marls.

There are many sorts of marls * of the earthy, as well as the stony kind; differing in texture as well as solidity, and variously impregnated; † and replete with salts, notwithstanding their various colours.

Of strong clay marles, there is but one sort that I have met with that is greatly impregna-
ted

* See Rational Farmer, second edition, p. 89.

† Vinegar is the truest test to prove it, vide Rational Farmer, second edition, p. 86. I have by me upwards of forty sorts of marls that abound with shells, all of which are replete with salts; but it may be relied on, that where-ever shells are found, be it in earth or solid stone, or of what colour soever, such are capable of improvement; as to the first, it will need no other trouble, than to dig and lay it out on the land; the latter, either pulverise or burn it into lime.

ted with salts, of which, however, there are various colours. This, though stiff in its nature, is very different in its power from the clay just before treated of; its consistence and texture being like hard soap, and apparently as free from grit or sandiness; veined with yellows, blues, and reds; the upper covering or stratum full of small shells, be it situated high or low, though no shells are within itself. But such consistence immediately meliorates, on being exposed to the air, &c. falling into flakes, and dissolving, so as to render it the most capable to unite with earth. This is the best manure for a loamy soil, and from which manuring, large crops of wheat never fail to be produced.

To describe each sort of marl, either the stony, gritty, shelly, or earthy, would be almost impossible, as well as useless; the farmer will find some in almost every farm, to enrich his land with, though perhaps all not equally good; and, as vinegar is the true test, each farmer may discover by diligence this treasure, * which indolence may have suffered to lye concealed, age after age, although even as it were in his bosom.

I cannot omit relating some part of Pliny's account of marl, which is, "That marls are

* The ancient Celtæ of Britain and of Gaul, gave marl the application of marrow, marg, margil, or marl; and they used it with great success in all sorts of soil.

“ are a certain fat of the ground, much like
 “ unto the glandelous kernels growing in the
 “ body of beasts, and thickened in the man-
 “ ner of marrow, or the kernel of fat about
 “ it. There is the white, the red, the co-
 “ lumbine, the clay soil, the stony, and the
 “ sandy, and all these are but two in nature,
 “ viz. either hard and churlish, or else gen-
 “ tle and fat.” Pliny speaks much of the
 stony white marl * for corn; as also the red
 marl, called Cappumargos, which hath min-
 gled in it a certain small grit full of sand; †
 he recommends that this stony marle be well
 bruised and broken on the land. ‡ He says
 the white is the fattest, whereof there are ma-
 ny sorts. Another sort of chalky clay, he
 says, the goldsmiths use, called Tripela, which
 lies very deep in the earth. A third kind of
 white marl, is that which the Greeks call
 Glischromargon: this, says Pliny, is no other
 than the fuller’s chalky clay, mixed with a vis-
 cous and fatty earth; the nature of it is to
 breed grafs, more than to bear corn. Co-
 lumbine marl, which the Gauls call Pelias,
 that is, dove, or pigeon marl, fetched out of
 the ground in clots and lumps like stones from
 a quarry, which will resolve and cleave into
 thin

* This sort seems to be our chalk marle.

† I have seen some of this sort, of a brownish, and
 others of a light colour in great abundance.

‡ See also Rational Farmer, second edition, p. 30.

thin plates or flakes, with sun and frost : this marl, says Pliny, is as good for corn as for herbage ; but he recommends in general to mix marl in a compost, before it be laid out on the land. *

With the greatest deference to the above author, and to those that practise mixing coarse stony marls in composts, before it be laid out, I must confess that I differ in opinion ; for, unless the ingredients that compose such mixture be altered, either by dissolving, or putrifying in such mixtion, it cannot have any effect ; it is very certain, that if chalk marls lye unexposed in mixtures, or in any other manner, such, during that time, continue unaltered, and of course cannot answer any end thus closed up.

Mr. Miller supposes chalks, and stoney marles, to be much of the same nature ; and that their fertility consists in the salt and oily quality ; as also, that marle contracts a large quantity of salt from the air, and for that reason it is the better, the longer it is exposed to it. † This is natural ; as it continues mouldering from changes of weather, and every part thus newly changing its surface, is continually imbibing nitre.

Thirdly,

* This method will do very well, if pulverised first, otherwise of no use in a mixtion.

† See also Winter Riches, p. 146.

Thirdly, Sea Sand.

This is another natural manure, and excellent for strong land, on which it operates, by opening its pores, thereby warming its frigid cohesive body, dilating and changing a cold clay to a warm fertilizing substance.

On the contrary also, cold clay operates on sandy land, by closing its pores, and rendering a body capable of retaining by its union, what before had scarcely any cohesion at all. *

Mr. Miller says, there are thousands of acres contiguous to which this treasure lies: that sea sand and shells are in various parts of England used to great advantage, especially in Devonshire, where they are at the expence of fetching the sand and shells on horses backs, twelve or fourteen miles. † The land on which they lay this manure, he says,

* See Rational Farmer, second edition, p. 89, 90, 105, And article *Clay*, of this treatise. To sea-sand may be added, muscle and cockle-shells, ploughed into the earth, which affords a rich lasting manure; being burnt, they make excellent lime; fine brick-dust, with equal quantity of this lime, mixed or tempered with bullocks blood, become also an admirable cement, which, being used either on a flat roof, or spread on a floor, is very compact, beautiful, and lasting.

† The same is done in Ireland.

is a strong loam inclining to clay; so that this separates the parts, and the salts that are contained in the manure are a very great improvement of their land: that coral, and such like stony plants which grow on the rocks, are filled with salts that are very beneficial to land; but as these bodies are hard, the improvement does not take place, the first or second year after they are laid on the ground, because time is required to pulverise them, before their salts can mix with the earth, so as to impregnate it. †—Indeed any sort of sand will be useful on a strong clay.

Lastly, Lime-stone Gravel.

Lime-stone gravel * is another natural manure, and a great promoter of vegetation, amazingly warming and nourishing the soil: there is something peculiar in this, even in its uncalcined state, which affects land more than any other stone does. Such as will not burn to lime, will not be serviceable in manuring the land.

There is a kind of inherent warmth in lime-stone, that thus affects land; and in general

† See Rational Farmer, second edition, last paragraph, p. 105.

* So called, as every minute stone will burn into lime.

neral, the texture of all sorts of lime-stone, though apparently close, is porous, and in some degree fusciplient. *

From such fine and delicate pores, no doubt but an exudation of warmth is produced in the earth, similar to the moisture or sweating of lime-stone in a kiln, where the fire is first made. One operating in the earth by the sun's influence; the other in the kiln, by that of the fire. And, as stones emit various smells, when broke, it shews that some inherent property inhabits there. † Such are flints, that appear in so great abundance in many parts of England, the taking away of which is very injurious to the land.

The sensible landholders in Buckinghamshire, and many other parts of England, know too well, to suffer such impoverishment to be committed on their land; while, in some other parts they are imprudently taken away, almost to the ruin of the soil.

Would the occupier of such land only give himself the trouble to examine the state of the soil under those flints, in the dry season of summer, during the scorching heats of the sun,

‡ A marble flap, which is also lime stone, may be warped with heat, or moisture; if warped by heat, lay it out in the dew, the convex side uppermost, with a weight on it, and it will return again to its former straightness.

† Break a flint stone, and you will find a strong sulphureous smell emitted from it.

fun, he might soon satisfy himself of their utility; he would there see a moisture, and an uncommon quantity of roots from the neighbouring plants, forcing themselves, as it were, under the stone for protection: remove those stones, and you remove the soil; nature having furnished such shallow dry land with these innumerable bounties, making it nearly equal to a fertile depth of soil.

And here let me advise the occupier of such land, not to be afraid of setting the ploughshare deep in this soil, but let his bullocks groan with deep ploughing; there not being any land that requires it more, or any land to which deep ploughing can be of more service.

But secondly, flint being a lime-stone, a peculiar quality of nourishment exsudes from them beyond any other sort of stone, which makes them of so much more use. Thus, whoever carries off the flints from his tillage-land, carries off the soil, and is guilty of a sort of agricultural suicide.

Of

Of Artificial Manures. First, Clay.

Clay, calcined in a kiln, * is an excellent manure; and, where there may be coarse land of this kind, it will always be found to be the cheapest, and one of the best manures, either for tillage, or coarse pasture. As I have taken notice of burnt clay, &c. in *Rational Farmer*, I think it useless to repeat it here, so shall refer my reader to that book.

Secondly, Salt,

This is one of those artificial manures which are valuable in tillage, of which I have spoke largely in the *Rational Farmer*, &c. || both in respect to manure, as also its use in food for cattle.

Pliny says, " And not only we men are
" solicited and moved by salt, more than by
" any thing else, to our meat; but sheep,
" oxen, and horses also, have benefit there-
" by

* See frontispiece, and p. 27 in *Rational Farmer*, second edition.

|| *Rational Farmer*, second edition, p. 34. *Winter Riches*, p. 159 to 164, p. 51, and 174. See its effect on the red worm, *Winter Riches*, experiment 1st, p. 160, to be used with lime, p. 162.

“ by in that respect: they feed the better,
 “ give more store of milk, and the cheese
 “ made thereof hath a more dainty and com-
 “ mendable taste by that means;” “ and,
 says he, “ salt is given to muttons and beefs
 “ to lick, to cure the scab.”

There is a salt, called *Foul Salt*, sold at 15 d. a bushel, duty free, to be applied to no other use than manuring of land, under a penalty of sixty pounds, as advertised from Nettleston saltern, and sold at Newport, in the Isle of Wight, at 16 d. a bushel—Recommended to be sowed at a proportion of three bushels an acre, when turnips are sown, to prevent the fly from damaging them. In respect to the quantity to be sowed for manure, the nature of the soil, and the time of using it, must be considered, as, from four to five bushels, if blended with the earth, by a summer fallow, and three bushels is sufficient an acre, if harrowed in with the wheat when sown. This method will be destructive to worms, at the same time that it manures the land. It is also called, *grey scow*, *scales*, or *crustings of salt*.

Thirdly, Lime.

Lime is another artificial manure, and is an excellent improvement on any sort of land, unless

unless such as lyes on a lime-stone quarry ; in this sort of land its improvement is not so great, it being in quality too nearly allied to such stone, changed only by passing through the fire.

This valuable manure I have mentioned sufficiently in *Rational Farmer*, &c.

Fourthly, Soot.

Soot, being of the artificial kind, though an incident by fire, must be ranked in this latter class ; and is of much use, both in tillage and pasture, although not so durable as many other manures.

Its action is quick and powerful, for two or three years ; after which its sulphureous and nitrous particles begin to weaken, and often entirely fail at the end of the third year.

In 1770, I saw a field of sainfoin that had been manured with common dung in one part, with sea-coal ashes in another part, and the third part with soot. The effect was, the part manured with soot was the best, the part on which sea-coal ashes were laid was the next, the part manured with dung was the worst of all.

Soot is an immediate destroyer of moss, while it retains its nitrous qualities, but, as soon as these are exhausted, moss will again return ; which, in general, is the third or fourth

fourth year. Twenty or thirty bushels † an acre is sufficient for one manuring of any sort of grass. ‡

Fifthly, Dung of Fowls.

These come under the denomination of artificials also, and are many in number, such as, poultry of all tame kinds, pigeons, rooks, and other birds. Pigeons dung in general has the preference, but that is a doubt with me; a rookery || is certainly as useful for manure as a pigeon-house, if properly conducted.

Columella ranges pigeons dung in the second class, and hens dung in the third. Varro prefers the dung of black-birds to any other. He says, “ The dung of blackbirds, “ gathered out of their bartons or mews, is “ preferable in producing the best food for “ kine, oxen, and swine; that they will be- “ come fat beef, and pork, sooner than with “ other food.”

Pliny says, “ That so great a quantity of “ blackbirds dung was gathered out of the “ bartons

† Four-pence a bushel is the common price; and a manuring of that quantity on the sainfoin caused an additional increase of nearly half a ton an acre, after the sainfoin had been almost worn out.

‡ See Rational Farmer, p. 35, second edition. And for destroying the red worm, Winter Riches, p. 161, exp. 8.

|| See Rational Farmer, second edition, p. 32.

“ bartons where they were kept, that the ar-
 “ cients could manure their land with it.”

Sixthly, Neat Dung.

In this article, oxen and cows * dung are included, both being excellent manures; for light, hot soil being of a rich, cooling, and consolidating nature, that from oxen is preferable.

Before Pliny's time this manure was approved of, especially when such cattle were fed on the shrub trefoil or cytibus. He says, “ The dung of such cattle, when fed on the “ shrub trefoil, or cytibus, was preferable to “ sheep dung.” He also recommends the dung of goats.

For further particulars, I refer my reader to *Rational Farmer*, second edition, p. 36, where I hope he will be fully convinced of the enriching quality of this manure.

Seventhly, Sheep Dung.

Sheep dung ranks in the class of artificials, and is very justly in universal reputation, al-
 though

* *Rational Farmer*, p. 36, second edition.

though much abused in the manner of applying it.

How can a man, who calls himself a farmer, or tiller of land, pen his flock on a burning fallow, and there let it lie, till all its nutriment is exhaled? A good husbandman would reverse this deformed sketch of impropriety, into an immediate ploughing such in; or would take pleasure in having a flock of sheep feeding on a rich pasture; from whence folded on the craving field, where previously a quantity of straw, short litter, or luxuriant weeds from ditches, that so profusely scatter their baneful seeds over the field; I lay, I strew them under a twice repeated trampling hoof; * which, when the flock so pass from end to end, the plough as eager follows to secure from the parching wind, or exhaling sun, † all its juicy treasure.

Lightly, Hog Dung.

This dung ‡ claims great attention, being in quality equal, if not superior, to all. The ancients disputed, whether hogs dung or human ordure and urine were most preferable.

Pliny

* In such case sheep should be folded twice in each place.

† See Rational Farmer, second edition, p. 33. Winter Riches, p. 18, 19, 25, third paragraph.

‡ Rational Farmer, second edition, p. 35.

Pliny says, next to the ordure of man, is the filthy dung of swine. Mr. Miller says, "Hogs dung is recommended as the fattest and most beneficial of all sorts of dung; that one load of it will go as far as two loads of any other dung; that it is the best of all dungs for fruit trees, and a very rich dung for grass."

And indeed the hair, and even the bristles† operate very powerfully on pasture, and in tillage.

Nintbly, Horse Dung.

This is more natural for pasture § than for tillage; in particular, such as is generally collected for tillage, it being a composition of all manner of filth winnowed from the barn, or from the stable sieve.*

If the farmer will use his yard litter, horse dung, &c. in tillage, let me intreat him carefully to preserve such from the barn, as well as from the stable feeds; otherwise the farmer propogates and nourishes his field enemy, against his yearly expensive efforts to get eradicated.

However,

† Rational Farmer, second edition, p. 35, 36, article Horse Dung.

§ When laid on pasture, the seed of weeds vegetate, and are thereby destroyed.

* See last paragraph, p. 37. Rational Farmer, second edition.

However, I could wish that horse dung were entirely disused, except in its rotation with vegetable and other manures, and for pasture; and then to take care to have it quite divested of any of those seeds which annoy tillage.

If horse dung may be at all commended, it must be for heavy cold land; but there are so many substitutes, that it may well be dispensed with, except in rotation, such as clay ashes, sea sand, gritty marls, &c. already spoken of.

Mr. Miller observes, "As remedies that are
" to be used, must be contrary to the distem-
" per they are to cure, so the dung of oxen,
" cows, and hogs, must be given to clean, light,
" dry earths, to make them fatter and clo-
" ser; and hot dry dungs to meliorate cold,
" moist, and heavy lands. The dung of hor-
" ses and mules is of admirable use in gar-
" dens in the winter time, because it then a-
" nimates and enlivens all things; and sup-
" plies the office which is performed by the
" heat of the sun in the summer-time, af-
" fording us all the novelties of the spring, as
" asparagus, cucumbers, &c." †
He says, "That horse dung is the best im-
" provement for jejune lands, that we can
procure

† Horse dung, &c. are here applied to hot-bed uses; not to tillage.

" procure in any quantity; but yet horse
 " dung being used alone, or when it is too
 " new, is frequently prejudicial to some lands.
 " And, though too much of it can scarcely
 " be used for cabbages, cauliflowers, and all
 " other plants that grow there, and require a
 " great deal of nourishment; yet may it be
 " a fault to lay too much of it on corn-lands,
 " because it produces abundance of straw."

Pray, can any thing point out the quality of
 horse-dung more fully than Mr. Miller has
 done; he acknowledges, indeed, that horse-
 dung is the best that can be procured in any
 quantity for poor land; which implies, that
 there are better, but not enough of other ma-
 nures for such land, as far as it appeared to
 him.

However, as daily improvements are advan-
 cing, so daily experience adds more knowledge
 to the penetrating and discerning husbandman;
 and larger quantities of all other manures are
 daily discovering themselves.

Those who are industrious, and seek after
 knowledge, find, that lime, sea sand, burnt
 clay, salt, pigeon dung, &c. are manures more
 natural for corn than horse dung; nay, Mr.
 Miller replies to himself, " That there may
 " be a fault to lay out too much of it on
 " corn land," Why? because, says he, as has
 been

been observed above, "it produces abundance
"of straw." †

Besides, Mr. Miller does not say, that
horse dung enriches the land; he only says,
that it warms cold land. He further says,
"There are two peculiar properties in dungs;
"the one is to produce a certain sensible heat,
"capable of producing some considerable
"effect; which properties are seldom found
"but in the dungs of horses and mules,
"while it is newly made, and a little moist;
"the other property of dung is, to fatten the
"earth, and to render it more fruitful; which
"dungs are, (as Mr. Miller says) those of
"oxen, cows, and hogs; and fittest for clean
"dry hot land, to make the earth fatter, and
"closer." *

Here it may not be improper to observe,
that Mr. Miller applies hot dung, such as that
of horses or mules to cold land, to warm, not
to fatten it: and the dung of oxen, cows, and
hogs, to hot earths, to fatten it: the proper-
ty of horse-dung, &c. is therefore to warm,
that of oxen, † &c. to fatten earths.

The same author also says, "Sheep-dung
"and deer-dung differ not much in their
"quality, and are esteemed by some the best
"of dungs for cold clay: some recommend
"them

† A precaution of injury, that he does not apply to
any other manures but horse or mule dung.

* Miller's Dictionary, p. 61, paragraph fourth.

† See article Cows or Neats Dung, Rational Farmer,
second edition, p. 36.

“ them to be beat into powder, and spread
 “ very thinly over autumnal or spring crops,
 “ about four or five loads to an acre, † after
 “ the same manner as ashes, malt-dust, &c.
 “ are strewed. In Flanders, and some other
 “ places, they house their sheep at night in
 “ places spread with clean sand, five or six
 “ inches thick; which, being laid on fresh
 “ every night, is cleared once a week; and
 “ the dung and urine of the sheep form a ve-
 “ ry rich manure, and of a considerable price;
 “ and is excellent for stubborn lands.” ‡

And Monsieur Quintency is of opinion,
 “ That this is the greatest promoter of fruit-
 “ fulness in all sorts of ground.”

These passages relative to sheep dung might
 have been more properly, perhaps, recited in
 the article Sheep Dung: but, as the excellent
 recommendation of it is not thereby lost, I
 flatter myself it is not here untimely placed;
 as it shews, that there are substitutes for cold
 poor earths, exclusive of horse or mule dung;
 to which I shall add the various sorts of stone,
 and sandy marls, clay ashes, common ashes of
 all sorts, sea sand, the dung of pigeons, and
 of other poultry, soot, malt dust, sea weed,
 &c. to enable the industrious farmer to pro-
 cure

† See Rational Farmer, second edition, p. 32.

‡ Sea sand, thus used, I should think the best manure
 known for strong land.

cure great abundance for his cold land, without using much of the horse dung manure to injure his crop, by producing an over-abundance of fruitless straw.

Tenthly, Horn Shavings, Bones, and Hoofs of beasts.

These may be included in the artificial manures; and, though the article may seem trifling in its title; this sort of manure deserves remarking for its rich and warming quality; they open, and keep separate, clogged earth; enrich and warm cold land, by the oil wherewith it is replete; and keep the pores of cold clay earths open, by their contrariety to cohesion.

Such oils or salts are in bones of all sorts of beasts, as well as fishes, † being as well as horn-shavings, great enrichers of land, and perhaps the most lasting invigoraters of any manure whatever; in particular, the horns and hoofs of all oxen, sheep, &c. when scattered and ploughed in for tillage; for, as long as there are any remains of them in the earth within the reach of corn or grass-roots, the latter will
grow

† As a confirmation, let the farmer view the under side of a bone, lying any time on the surface of the ground.

grow and adhere in so abundant a manner as no where else to be found. †

Eleventh, Hair of beasts.

People not having had it in their power to know the usefulness of this manure, may look on a recommendation of it as trifling; but impartiality, that brilliant gem, attending every pursuit of a well formed mind, may soon convince every farmer of its utility, by his own experience.

The black hair of bullocks, &c. * is made a considerable commodity of exportation from many places; and those tanners who hold land in their own hands, that have experienced the utility of neats hair, both in pasture and in tillage, don't chuse to sell the other coloured hair for plaisterers work, &c. but employs it all for land purposes, except the black coloured hair, as before observed.

Besides the oil wherewith the hair of all beasts is much impregnated, there is no doubt an additional nutriment arises from the tan pit liquor; a circumstance which seems to correspond with the opinion of the ancients,

O

“ That

† Much used in the west of England, and in some parts of Ireland, where they lay out large quantities of herrons, and decayed fish, as manure for their tillage land.

* Rational Farmer, second edition, p. 36.

“ That the hair of beasts, soaked in man’s
 “ urine and quick lime, from the tanner’s
 “ pit, was good for land.”

Twelfth, Soap Ashes.

Soap ashes is another of these artificial manures, which, in some places, are sold at a high price, * though in others they will not even lay it out on their land, if given to them. I have seen some hundreds of loads lying in wastes near large towns, † accumulated from time to time by the soap boilers of the place.

However, where more industry and knowledge is cultivated, there its utility is cherished, as in Nottinghamshire, Lancashire, Yorkshire, and in many other places, where they mix train oil with the ashes, to make it more fertile.

Lastly, of Calcined Weeds.

Ashes of burnt weeds are good for all sorts of land, except the very light and sandy; ‡ but

* Large quantities are yearly shipped from Dublin to Lancashire.

† Particularly at Stamford in Lincolnshire.

‡ For this sort, see the article Clay.

but these, as well as wood, and sea coal ashes, § must be kept dry, until they are laid out on the land; otherwise, much of their saline particles will be lost.

Ashes from sea coal are the best for cold clay land; as these and sea sand open that close and heavy texture, more than the finer ashes of wood, used either in tillage or on pasture; on the latter, they never fail of producing a natural white clover, though the land may be cold and heavy, if the water be properly taken off; and all ashes do the same, more or less, on all sorts of land.

Mr. Miller says, " All sorts of ashes from
" vegetables, are an excellent manure for
" land; so that where the ground is over-run
" with bushes, brambles, &c. which are
" woody, if they are grubbed up in summer,
" and spread a little time to dry, * then gently
" consumed to ashes, and these laid on
" land, will greatly improve it."

Sea weed ashes is much stronger manure than any other, as the marine salts are so much more powerful in them, than in any other weeds; these sea-weeds are in great plenty on most of the sea coasts in England.

In Italy and Spain, they have an herb called *Kali*, sea reek, or sea weed, that is very
much

§ See Rational Farmer, second edition, p. 87.

* See Rational Farmer, second edition, p. 87, 88.

much impregnated with a sort of marine juice, † which they cultivate in their fields, and burn it, whilst green, into ashes. They dry these weeds a little, then tying them up in bundles, burn them in pits or holes made in the ground; and, when the whole has taken fire, they cover the pits, and so let it burn out of itself.

This they call *barilla*, and is much preferable to our kelp, which we make in that manner from sea weeds gathered on the coasts.

Pliny relates, " That the people beyond the Po, made such account of ashes to enrich their lands, that they preferred them before horse muck, and such like."

Green vegetable Manures.

All sorts of green vegetables are good manure, but there are some impregnated with saline, as well as oleose, juices more than others: of these are sea weed, leaves of trees, lupines, beans, vetches, clover, buck wheat, turnips, &c.

Sea weed, or sea reek, * being the most powerful, I shall mention it first; lamenting the

† Hence it is called *Kali*, &c.

* To which might be added, sea mud, after it has been in a heap twelve months, and turned two or three times.
Sea

the loss of so many thousand loads being neglected on some coasts, where it would be of the utmost utility to the adjoining lands; and is the first green vegetable manure we are blessed with.

The best method to prepare sea weed for manure is, to make a mixtion of it with earth, by putting a layer of earth, and a layer of sea weed, immediately from the sea, alternately, varying the earth according to the soil it is intended for. †

By this method, the salts of the sea weed in its putrefaction, will be retained in the earth designed to be laid out for manure; whereas, if sea weed were to be laid up in a heap by itself, its juices, and thereby much of its nourishment, would be wasted.

Mr. Miller says, "Where sea weeds can be obtained at an easy expence, they are by far the best kind of manures, because they enrich the land for several years; for, as their

Sea weed, called by the inhabitants of Belleisle, *Gasmon*, is much used in that isle as manure; a gentleman who had been there informed me, that the fertility of soil is remarkable; that in the memory of man no harvest ever failed; that they manure the soil plentifully with sea weed, which fattens and improves it more than any other manure: and that in Montpellier, the people use it for litter for their cattle, and prefer it before any other dung whatsoever.

† Viz. light to heavy, and heavy to light; observing this general rule, never let weeds grow on any mixtion or composition intended for tillage.

“ their salts are closely locked up, they are
 “ communicated by degrees to the land, as
 “ the heat and cold cause the bodies to pul-
 “ verize, and fall into small parts; so that
 “ where sand and smaller kinds of sea weeds
 “ are used, if they are laid on land in proper
 “ quantities, they will enrich it for six or se-
 “ ven years.” †

A gentleman who was at Sir James Hall's, at Dunglass, in East Lothian, in the year 1742, says, “ The soil hereabout is very
 “ good; and the sea ware which the sea casts
 “ up, abundantly supplies the defect of marl,
 “ chalk, or lime stone; for by laying this
 “ continually on the land, they plough every
 “ year, without letting it lie fallow, as we
 “ do; and I found they had as much corn, as
 “ the ploughman expresses it, as could stand
 “ on the ground.”

Be not offended, my good farmer, at mentioning this trifling manure. I know many of you have it at your doors; and those who have not this, are possessed of hedges, ditches, &c. † full of filthy weeds; collect these with thy garden, orchard, and rick-yard weeds, before they seed, and make a compost from them and earth. Or, as Cato says,
 “ Weed out of the standing corn, wallwort
 or

† See Winter Riches, p. 54, article Sea sand, and notes.

† Rational Farmer, second edition, p. 31.

“ or danewort, &c. and from thy pasture,
 “ hemlock, thistles, &c. * also about the oſi-
 “ er plots, pluck up rank weeds, reek, or ſea
 “ graſs, &c. and ſtrew them under thy fold-
 “ ed ſheep.” He alſo ſays, “ Make an arti-
 “ ficial muck with litter, lupine ſtraw, chaff,
 “ bean ſtalks and leaves, and branches of
 “ trees,” to which I add, clear the hedges of
 thistles in particular.

Mr. Miller again ſays, “ The reſuſe of a
 “ kitchen garden, when laid in heaps, and
 “ rotted, will alſo afford a good ſort of ma-
 “ nure for corn.” He obſerves, “ That they
 “ cut down fern, when it is young and ten-
 “ der, and lay it in heaps to rot in many pla-
 “ ces of the kingdom, which makes an ex-
 “ cellent manure for land; † and, as it is a
 “ troubleſome plant in many parts of Eng-
 “ land, ſo by frequently mowing, it may be
 “ deſtroyed; and when rotted, a good quan-
 “ tity of manure may be obtained; ‡ which
 “ will

* Dr. Woodford ſays, “ That he has calculated, that
 “ one thistle will produce at the firſt crop 24000; and
 “ conſequently 576000000 of ſeeds the ſecond crop. The
 “ divine Virgil calls that weed the *lazy thistle*, becauſe
 “ none but a lazy huſbandman would ſuffer ſo pernicious
 “ a weed to infect his corn. And Servius tranſlates
 “ the word, a ſerpent, to ſignify terrible, or horrid.”

† Vide this treatiſe, p. 67, article *Chaces*.

‡ The large quantity of ſaline juice that fern is replete
 with, appears manifeſt from the uſe ſoap boilers and blea-
 chers of linen make of it.

“ will more than defray the charges of cutting it down.” He also says, “ There are various sorts of weeds, which infest the lands in many parts of England, which, if cut down at a proper time, and laid to rot, might be used to great advantage for manuring of land; and hereby the weeds would in time be destroyed, and the manure would more than pay the expence of doing it: was the farmer willing to try, there is great room to make improvements of this kind, especially in countries where dung, or other common manure is very scarce; in which places, if some experiments were properly made, of rotting whatever vegetables could be procured in the neighbourhood, a great improvement might be made of the land.”

Mr. Miller mentions rotten wood and saw dust as a very good manure for strong land; because it loosens the parts of the earth, and renders it light.”

Hence, there is no doubt, from many authorities, and our own experience, that vegetables prove an unexceptionable manure; either rotted in a compost, where all their juice may be preserved, or in the earth, when turned in with the plough. †

It is likewise certain, that weeds of ponds, lakes, ditches, &c. being dragged out before they seed, and

† Winter Riches, p. 100, sect. 1.

and laid in heaps to rot, will make excellent manure, as will most other sorts of weeds, be they produced from wet or dry situations; all of which should be cut down, as soon as they begin to blossom, to prevent any seeds from being ripened; at which time also, weeds, &c. are in their fullest perfection of juice and salts.

Mr. Miller also observes, " That in rotting these vegetables, it will be proper to mix earth, mud, or some such substance with them, to prevent their taking fire in their fermentation; which they are very subject to, where they are laid in heaps, without any other mixture to prevent it; and it will be proper to cover the heaps over with earth, &c. to detain the salts; otherwise, many of the finer particles will evaporate in fermenting. When these vegetables are thoroughly rotted, they will form a solid mass, and cut like butter, and, being full of oil, will greatly enrich land."

This vegetable system being little known among the farmers, and less practised, obliges me to call in the aid of those, who have also had reflection and experience, in order to enforce and bring it into a more general use, as it is, however light and trifling, in the opinion of the unexperienced, of the greatest consequence to agriculture.

And,

And, as a further confirmation of the value of this vegetable system, permit me to relate an interesting passage, given us by the great C. Plinius Secundus, " That when the
 " Salassians made roads into the vale lying
 " under the Alps, as they foraged the country all over, were determined to destroy the
 " fields of Panick and Millet, being then
 " come up, and forward in growth; they
 " therefore set ploughs to work, and turned
 " all under furrow. But what ensued? these
 " fields bore a twofold crop the ensuing year,
 " and yielded so plentiful an harvest, as that
 " thereby the peasants learned the device of
 " turning corn in the blade into the ground.
 " And this point of husbandry they put in
 " practice, when the corn begins to gather,
 " and shew the stem or straw."

Besides the before recited authors, I shall also take the liberty to add a few lines from that elaborate chymist, Glauber; who, in his *Miracle of the World*, says, " Sulphureous
 " sweet salt is the most excellent medicament
 " of all vegetables: barren lands are made
 " fruitful by this salt, * which may be used
 " instead of dung. Of such, wood-ashes,
 " stones burnt to lime, † or other bodies, putrified by length of time. But the chief

* Rational Farmer, second edition, p. 86, &c.

† See Winter Riches, p. 162.

“ is saltpetre, being the salts of vegetables;
 “ animals, † and minerals putrified; it is en-
 “ dowed with a certain occult and sweet fire,
 “ not of a cubical form, as is observed in cor-
 “ rosive bodies, but dart like, or acuminate.
 “ By this signature, nature intended to shew
 “ of what condition and virtue salt petre is.”

Secondly, Leaves of Trees.

Leaves of all trees, plants, &c. may be con- sidered as the common lungs, through which the plants receive nourishment from external moisture, and air; which, being full of acid and sulphureous particles, are continually working as the instrument of respiration, serving in the vegetable world, as the lungs of man, &c. in the animal.

There cannot therefore be the least doubt, but that all vegetables are replete with salts, as animals are; both the external and internal nutriment of leaves being nothing less than a neutral salt, composed by the attraction of the acids to the salts of earth, water, and air; † therefore

† If the salts of animals are of so productive a nature, how much more useful the whole internal part, see the whole article of Cows, or Neats Dung, Rational Farmer, second edition, p. 36.

† See Rational Farmer, second edition, p. 88, l. 16. Note, see Winter Riches, p. 147, article *Perspiration of Plants.*

therefore more particularly fitted with an enriching quality, than the stems, &c. However, experience has furnished us with ample proof of the great quantity of oil, and salts, contained in leaves of trees, from their long retention of heat, when put together for that purpose, even much beyond that from horse or mules dung; this is evident from the second year's operation, if kept dry. For, after a six or eight months strong fermentation, not violent, and immediately exhausted, but of a long and equal duration, they will, by putting them into an unpressed heap, and kept dry, go through the same the succeeding year, and in such manner to preserve and make perfect the second crop of melon and cucumber, earlier than can be procured from the dung of any animal.

This has been practised many years by Mr. Richard Clark, gardener to Lady Francis Elliot, near Chiswick, Middlesex, who is, much to his credit, the discoverer of its great utility in garden use.

The garden, under this ingenious gentleman's care, is not incumbered with such a multitude of weeds, the never failing produce of dung; neither are the vegetables or roots of those, or trees, cankered with poisonous horse dung.

Can it then be doubted, but that leaves of trees are equally as advantageous in the field? surely

surely not; and although their excellence is but little known among the modern improvers of land, yet the ancients were well acquainted with it.

Thus Cato, " Put leaves and branches of trees, maltholm and oak together, to make a muck."

Is not the loss of so many thousand loads of this treasure to be lamented, where the consequent fertility is so much wanted? Let a man but cast his eye into the thick and extensive woods, * in parks, and other demesnes, and he will there see the elaborate riches of nature lie ungratefully neglected; whilst the neighbouring impoverished land mourns with barrenness for want of it.

When the leaves of trees are intended for manure in the field, a little earth should be mixed along with them, and moisture admitted, to help a fermentation, that they may mellow and rot; and the sooner they are thus mixed up, the better; as, the longer they are exposed to water and air, after they are fallen from the trees, the less will be their nutriment. If for common dung, they should be laid in a pit, and trod close together, in some shady place, till they are rotted.

Thirdly,

* See Rational Farmer, second edition, p. 37, article *Leaves of Trees*.

Thirdly, Lupines.

The farmer asks, What are Lupines? This question I shall let Pliny answer, who says,
 “ There is not a plant growing upon the
 “ earth, (I mean such as are sown of seed)
 “ more admirable than the lupine, in regard
 “ to the great amity and sympathy between
 “ them and the earth. Moreover, they have
 “ three seasons of blooming; the seed loveth
 “ the earth well, but delights not to be covered over with mould; † for this is the
 “ only seed that is sown upon ground, without ploughing or digging; it would chuse
 “ to grow in almost a gravelly, dry, and sandy soil; and in no case can it abide any
 “ tending or husbandry about it: so much
 “ does it affect the earth, that, though it be
 “ cast upon a rough ground among bushes,
 “ leaves, briers, and brambles, it will chit
 “ and spurt nevertheless, and never cease, till
 “ it take root in the earth. But, for the most
 “ part, the husbandman bestows a light furrow upon it. If Lupines be sown thin,
 “ either in vineyards, or upon corn land, they
 “ enrich the same, as we have already written: and so little need have they of dung,
 “ that

† Birds don't like to eat this seed, on account of its bitterness.

" that they themselves stand instead of the
 " very best. For the maintaining and en-
 " riching of strong land, it must be plough-
 " ed in after the third blossoming. But in a
 " gravelly or sandy soil, after the second.
 " Furthermore, all men are of opinion, that
 " nothing is better for the ground, than to
 " sow lupines thereupon, provided always,
 " that before it cod, † it be turned into the
 " ground by the plough. Also, when it is
 " cut down, to make it into wads, which are
 " to be buried at the roots of trees, and vines
 " especially." Pliny, mentioning the twen-
 " ty fourth of June, says, " Now would lu-
 " pines be turned in with the plough, to en-
 " rich and manure the ground, the fruit itself
 " is a battening to the earth; * as also beans
 " and vetches, for they are very muck." And
 " Columella says, " That sixteen bushels of lu-
 " pines, par-boiled, will manure an acre of
 " land." †

The sort of lupine here mentioned, is the
 narrow leaved tall blue lupine; † and, though
 not so common in England as the other sorts,
 yet

† That is, when in blossom. Note, Columella says,
 lupines will make the husbandman amends, if he has no
 other dung.

* Signifies to make the earth fat.

† Winter Riches, p. 97.

† See Mr. Miller's Dictionary, on the species of *Lupinus*.

get in Spain and Italy, is the most common, where it is sown to manure the ground.

Ray says, "That he saw lupines sowed in Tuscany, not only for aliment, but also to fatten the soil. " And," says he, " Pliny tells us, that the fields and vineyards are enriched by the sowing of lupines, as much as by the best kind of dung."

Theophrastus observes, that lupines thrive better on a poor sandy soil, than on a rich land.

Mr. Mortimer says, that lupines are an excellent pulse; and require little care; they are advantageous to any ground they are sown on, and are a good manure for barren land; In Italy (says he) they are sown in the fields for their cattle, or, being sodden in water, the fruit is excellent food for oxen and other cattle."

Permit me, once more, to mention what the celebrated Mr. Miller has said relative to ploughing or manuring land with vegetables. After he had recommended weeds of ponds, &c. as before recited, he adds, " In such places where there are neither ponds, lakes, or ditches to supply these weeds, and the situation is far from the sea, from whence may be obtained many sorts of weeds for this purpose, there may be many sorts of vegetables sown, in order to plough them into the ground, when they are full grown, to enrich

"enrich the land: at present, those chiefly
 "used for this purpose, are buck wheat, *
 "vetches, † and spurry: ‡ and in some
 "countries abroad, they commonly sow lu-
 "pines upon such land as they want to im-
 "prove; and, when these are full grown,
 "they mow them down, and plow them in-
 "to the ground; which they esteem to be
 "good manure. This is chiefly used in the
 "south of France and in Italy, where
 "some of the sorts of lupines grow natural-
 "ly." He further says, "I have known
 "some land sown pretty thick with horse
 "beans, which have been mowed down when
 "they were in blossom, and ploughed in for
 "a crop of wheat, and it hath largely paid
 "the owner. Almost any of the pulse kind
 "that grow large, are very proper to be sown
 "for this purpose; and, next to these may
 "be sown mustard, cole seed, § or any of
 "these large growing plants; which, if cut
 "before they form their seeds, and ploughed
 "in, will greatly enrich the ground."

In short, there are so many corroborating
 authorities, both ancient and modern, to con-
 firm my experimental vegetable system, that

* Winter Riches, p. 11, 55, 68, and 95.

† Winter Riches, p. 67.

‡ Winter Riches, p. 25, 97.

§ Called Rape.

not the least doubt can remain of its great utility in tillage.

But alas! is it not a piteous tale, to tell the common farmer what Mr. Miller, and others, say of him, viz. " That there are but few
" people employed in husbandry, who care
" to get out of the old beaten road, to try ex-
" periments, even where they are attended
" with little expence, and nothing hazard-
" ed."

But, whilst we have petulant opposing babblers, against any improvement that does not immediately arise from themselves, who write whole volumes, which scarcely contain one sentence of instruction; but are crowded with ill judged ideas, and surmises, by their want of experience, confounding the true principles of agriculture—I say, whilst there are such, we need not expect to find that tender plant taking root.*

However obstinate man may be, or how little regard soever he may pay to advice, I must assure him, that nothing shall stop me from telling him, that there are so many easy substitutes every where to be found, for every kind of soil, to manure his land with, instead of horse dung; together with the many chan-
ges:

* I refer to my address to the reader, *Rational Farmer*, second edition, and *Winter Riches*, p. xii.

ges and refreshments, cheap and convenient, that it reduces the principles of agriculture, even to a mere toy, in respect to keeping a number of expensive horses, in order to make a large quantity of dung; * which horses are, as it were, so many moths destroying his garment,

Fourthly, Beans.

I have always found that beans † meliorated land very much; and had great confidence that they were also enrichers of the soil; I am now confirmed in that opinion, by the corroborating knowledge of others. Pliny says, "That good husbandmen are of opinion, that the bean straw sown early, and ploughed in, are better than the corn to let ripen; for the pods and stalks only are passing good for fodder, and forage of cattle: the ploughing it in is as good as a mucking, for it enricheth it mightily. That in Macedonia and Thessaly, they plough in their beans for manure, when they are in blossom."

This is one of the many kind substitutes to enrich the land with in summer tilth: What pleasure

* As recommend by Mr. Arthur Young.

† Page 113, of this treatise.

pleasure must the good husbandman receive from those benevolent showers, that pours down, not drops fatness into his arms!

I cannot pass over this article, without observing to my reader, that beans, as well as wheat, and other grain intended to stand to ripen, are sown much too thick. Beans should not be nearer than twelve, or at least nine inches square; there is no sort of pulse more subject to mildew, or blight, than beans. The farmer generally sows them very thick: indeed, it is ten to one that a crop escapes being infected with the insect called the *black dolphin*, even so much as to cover the stem, as well as leaves and blossoms, when they are sown too thick. This at once puts a stop to perspiration, by closing up all the pores.

The farmer generally sows three bushels of horse beans on one acre; this is more than double the quantity that ought to be sown. Mr. Miller observes, "That beans will bear
" in greater plenty, when sun and air † are admitted, and be much sooner ripe, than
" when so close as the common custom is,
" by which the farmer wastes a double quantity of seed, and receives only half a crop."
This will hold good of all other grain.

Fifthly,

† See Rational Farmer, p. 76, Winter Riches, p. 192, sect. 6.

Fifthly, Vetches.

The general use to which vetches † are put, is either for seed, or soil for horses. The winter sort is sown in October or November, and thereby rendered very useful for soiling horses in the spring. After which, buck wheat, turnips, rape, &c. may be sown, and pen fed off with sheep, and afterwards the ground sown with wheat.

But vetches, as Mr. Miller says, "Is an excellent manure ploughed in, or pen fed off with sheep, for the benefit of their dung."

The wild vetch, or *crinum* of the ancients, were by them much esteemed, with which they fed their oxen, and whence it derives its name.

Winter vetches ‡ and rye, or vetches and oats, || or barley, sown together in October or November, instead of so much land wasted under a winter fallow, pen fed off the beginning of May, and immediately sown with turnips,

† Winter Riches, p. 67.

‡ Rational Farmer, second edition, p. 23.

|| Pliny mentions a Greek oat, that never sheds the seed out of the husk; and says, they are sown with beans and vetches for green food for horses, &c. called *scymum*, signifying, according to Varro, *quick*; in Latin it signifies *propender*, &c.

nips, or buck wheat, and pen fed off again, or ploughed in, is the best preparative for wheat, observing to alter the sorts so sown alternately. This is part of my vegetable system, set forth in *Winter Riches*, to which I refer my reader for further particulars.

Sixthly, Red Clover.

Clover is become almost universally known, and is of great utility to land, either to stand for hay, then ploughed up, and sow a crop of wheat, or pen fed off with sheep, and then with wheat; or ploughed in as manure † to the ground, when in blossom in May, some other vegetable being immediately sown, and pen fed off with sheep, and lastly sown with wheat. Either of these three are good preparatives for wheat, alternately used with other vegetables.

Of this species we have the large red clover, honey suckle, or meadow clover, small white, or what is commonly called *Dutch clover*, and trefoil.

The first of these is what I have just recommended. The third is fit for pasture only, and the trefoil best adapted for hay.

Red

† *Winter Riches*, p. 12, last paragraph. *Rational Farmer*, second edition, p. 22.

Red clover is also very valuable for feeding hogs, which I have fully explained in *Rational Farmer*, second edition, p. 38 to 42. And *Winter Riches*, p. 42, 43, 44, to which I refer my reader. Observing, that land will tire of red clover, when too long oppressed with it in common tillage.

Seventhly, Buck Wheat.

Buck wheat, ploughed in when in blossom, is a great enricher of land: it is particularly well adapted to light land, since, like lupines, it will flourish where scarcely any thing else can grow.

When green, it may be applied to different uses, both as food for cattle, as well as manure to land. Remembering, that changes of food is highly necessary to all beasts, when fed on artificial food; it gives a fresh appetite, and each corrects the other. It is excellent for feeding pigs, sheep, or cows: † it promotes milk, and makes butter and cheese better tasted, than when cows are fed on any other vegetable, lucern alone excepted—all these good qualities must naturally recommend it. But this grain, as well as all others, when given to cattle, should be first broken in a mill.

And,

† *Winter Riches*, p. 55.

And, as to its use as manure, it is no less valuable, growing on the same land it is meant to enrich; requiring only the plough to cover it in the earth, when it is in blossom.

The succulence, and glutinous quality of buck wheat, when in blossom, renders it admirable to enrich, * and makes more compact a light sandy soil.

As to its grain or seed, too much cannot be said of it; but as that has been mentioned in *Winter Riches*, p. 55, sect. 1, it need not be further enlarged on here.

However, I cannot pass over this article, without relating the following passage from Mr. Miller, " Buck wheat is sometimes sown very thick, † and suffered to grow until it is in blossom, and then ploughed in, which makes a very good lay for wheat or rye: it is cultivated in many parts of England, and is a great improver of dry barren lands; yielding fifty or sixty bushels an acre, and is excellent food for hogs, poultry, &c. ‡ The flour of it is very white, and makes a very good sort of pan cake, if mixed with a little wheat flour; the straw is very good fodder for cattle; and the grain given

* I have seen an instance of its great service to land, where it has only been sowed, and stood for a crop.

† Rational Farmer, second edition, p. 15.

‡ Winter Riches, p. 55. sect. 1.

“ given to horses * among their oats, will
 “ make them thrive; but it must be broken
 “ in a mill, otherwise it is apt to pass thro’
 “ cattle whole. † One observation has been
 “ made against this useful succulent, that it
 “ ripens its seed late in the season; to which
 “ I answer, that the reason of its late ripen-
 “ ing, is the late sowing.

Eightly, Turnips.

Although the character of this root is so well known and approved of, yet we are told that in some parts of Cornwall, it is much rejected for field culture. The farmers looking on the field turnip advocates as so many monsters! But new improvements in agriculture must ever expect to meet with the same opposition, from contumacious man. As its usefulness has been so often mentioned in *Rational Farmer* and *Winter Riches*, and also in various parts of this treatise, it would be needless here to repeat it. ‡

R

Lucern.

* *Winter Riches*, p. 51.

† All grain given to any beast, should be broke in the mill, even the favourite oat.

‡ Turnips for cattle food, see *Rational Farmer*, second edition, p. 61 and 62, and *Winter Riches*, p. 1 to 19. In *Winter Riches*, p. 6. some observations, relative to the prevention of flies destroying turnips, are mentioned; since which, some other practice with good success, has been used by a relation of mine in Hampshire; namely,

Lucern.

This is the most beneficial grass we have for summer use, where the soil is fit for it. Lucern will answer very well in a dry sandy land, but much better in a rich loam.

Lucern, or medica, is that medica which Virgil, Columella, and other ancient writers, have spoke so well of in their excellent treatises on husbandry. For its use and culture, see *Rational Farmer*, second edition, p. 43 to 46.

Mr. Miller observes, that it was brought over from France into England, in the year 1650, " But, (says he) whether for want
" of skill in its culture, whereby it did not
" succeed, or that people were so fond of go-
" ing on in their old beaten road, as not to
" try the experiment, whether it would suc-
" ceed here or not, was the occasion of its
" being entirely neglected in England, I can-
" not say."

I have

namely, penning on the turnip ground as soon as the seed is sown: this appears from reason to be a good presau-
tion, as it not only makes the earth more close and com-
pact for preventing a lodgment of the flie, than rolling can
do; but the urine and dung also enrich the soil so much
the more, to forward the turnip in its growth, out of the
flies way. To which I shall add, that if twenty bushels
of soot were strewed on the ground, and harrowed in
with the seed, it would greatly favour the crop, enrich
the soil, and be a good preparation for wheat, when the
turnips are sown early, and pen fed off.

I have had much experience of its culture in both the disputed methods; and, for my part, I must declare, that the broad cast is the most eligible for the farmer, where the land has been, husbandman like, cleared from the weeds.

Some of the drill advocates are strenuous supporters of that opinion, and many of them are gentlemen of much merit, from whom, with great deference, I must differ in opinion from my own experience.

The reason the drill system came to be thus modified, was from the pernicious custom of using horse dung to the tilled land, whereby such innumerable, and almost unconquerable weeds were produced. Hence Mr. Tull went into the drill husbandry * for wheat, &c. and some others have followed him in England, France, and other countries.

As no other system but horse dung, or fallowing of land, and some places marl, in Mr. Tull's time was known, except sheep-penning; fallowing of land, to eradicate these poisonous weeds, and to enrich it also, the drill system was undoubtedly the most eligible to Mr. Tull, &c.

But as the vegetable system has so much the advantage of fallows, to enrich land, as well as being cheap, and most profitable, † together

* Winter Riches, p. 91.

† Winter Riches, p. 119, sect. 2.

ther with being an entire destroyer of weeds, that objection is fully set aside.

Hence then, the cause being removed by another system, medicines of course should cease; health and vigour being again restored, nature will go on anew, uninterrupted.

This being the state of land in the vegetable system, broad cast husbandry removes these difficulties from the tiller of land which drill husbandry clogs him with; as many of those, who have incumbered themselves with the drill system, are tired, and entirely laid it aside.

But still there is a confused opinion relative to the manner of carrying on the drill system, with lucern in particular. Some recommending it to be transplanted into drills from the seed bed, and others sow it in drills, and thin the plants to a proper distance. †

The former being the most prevalent custom, I shall take the liberty to discuss that point a little, in order to set the reverse or latter method in its true light, by refuting the error of the first.

Transplant it, say they, that the tap root may be cut off, to prevent its taking deep root, thereby causing a number of lateral roots instead thereof, which will cause the crown or head, to be more enlarged.

If

† If drilled, this is most consistent.

If first principles were to be the basis of action in every art and science, how much more would they be advanced, and surely in none more than in the science of agriculture.

Thus, in respect to the culture of lucern, its natural tap root enables it to exceed any other vegetable grass yet known. By this tap root, lucern, in a dry hot burning soil, where every other common superficial rooting grass withers, and is burnt up, as if baked in an oven, searches deep in the ground for nourishment, far below the influence of the scorching sun, flourishes, as it were, in triumph, over all others.

How base then must that custom be, which deprives this plant of its natural support, by cutting off the tap root, and forcing it to seek for food only, within the power of the burning element, thereby (as it were) foiling nature, and transforming a denizen plant into an alien, and made a stranger to the soil of its only inheritance.

I say, for want of first principles, the culture of this plant is by some thus mangled; not satisfying themselves with acting so unnatural a part, but recommending it as a meritorious improvement.

As there is nothing made in vain, (substitutes being appointed for deficiencies) so of course this long tap root, peculiar to lucern and sain foin, has been adopted by the wise disposer

disposer of all things, to flourish and give sustenance to his creatures, in such soils where other grass of a different formation could not subsist.

But what have some of these advocates for the drill done! Supposing they have removed this plant into soils unfit for, and unnatural to it—into cold moist soils, fit only for the superficial rooting grasses: in such soil, the tap rooted kinds would decay and perish, by the stagnated moisture therein contained; and for that impropriety, lucern is deprived of its root, and recommended as the best method of cultivating it, without any exception.

Just so will that noble tree, the English elm, when planted in a soil where its root must soon penetrate into stagnated moisture, sucking up through those tender vehicles unnatural crude water, till the whole plant is decayed, and the roots perfectly black and stinking by putrefaction; and this in a soil where aquatics are in their glory. *

Let me therefore request my reader to avoid that error, be it in drill, or broad cast; assuring him, that where there is a good, dry, light loam, or a drier sandy soil, lucern, not deprived of its root, will far exceed the other:

all

* A recent and striking example of this may be found in the elms planted round the canal in St. James's park, hundreds of which died, and were taken away in 1771, whilst the willows flourished.

all plants whatever has their own peculiar nature, requiring different soils, and different culture.

In respect to the drill method of cultivating this plant, it is incumbering the farmer, without an adequate profit. But let his land be husbanded with vegetables, &c. instead of dung, and sown in the broad cast, hoeing his plants out to about nine inches, or one foot distance, according to the nature of the soil; and then there is no need for his putting himself to the necessity of a formal repentance, † after committing an error, founded on self-sufficiency, or being misled by others.

Of Sain Foin.

This is another artificial grass, equal to the former, for some purposes and soils: the name carries with it its quality, being derived from *sain*, sound or healthful, and *foin*, hay, in the French language; thus we may call it the healthful hay for cattle.

The soil best adapted for this excellent grass, is such as is not so proper for lucern; or even fit for any other natural or artificial grass, viz. a flinty marl soil: of such, a large number of acres may be seen under *sain foin* in

† See Winter Riches, p. 170.

in many parts of England ; though much rejected in other places in the same circumstance.

In this dry flinty land, sain foin thrives to admiration, and on which the farmer has often benefited himself forty or fifty fold ; nay, land that was not worth even tilling, has, from the cultivation of this plant on it, profited five or six pounds an acre yearly to the occupier. *

What further profit to the community might be made from thousands of acres of such land lying neglected, were the same industry employed. That a large quantity of hay might be thus accumulated, to supply the loss of many thousand acres of fine old pasture, now converted into tillage, is self-evident.

Sain foin requires no particular culture ; it requires only, that the land should be well tilled, and sown along in broad cast in April : great care, however, must be taken in making it into hay, though I think not more than is necessary for lucern, or for clover ; the well making of all which, depends entirely on favourable dry weather.

It may justly be called sain foin as food ; when dried, it is much beyond any other, either for horse, bullock, or sheep, the latter
in

* Winter Riches, p. 171, and Rational Farmer, second edition, p. 47.

in particular bear a sufficiency of wool the succeeding summer, after such winter's food, more than after any other winter food. Bulls coat well on it, and horses require very few oats when winter fed with it * : however, I have seen great crops of sain foin in a deep rich earth, much exceeding any crop in the first mentioned soil.

Of Snow.

Although I have mentioned the importance of this winter protector in the *Rational Farmer*; † yet I cannot pass over relating a passage of Virgil, as told us by Pliny. Some people had advanced, that winter dust was better for corn, &c. than moisture, which occasioned Virgil to express himself thus: “ But
 “ in truth, that winter dust should cause a
 “ plentiful harvest, was spoken in boast, and
 “ proceeding from a pregnant wit, and jolly
 “ spirit: for otherwise, who knoweth not, that
 “ every man (wishing well to trees and corn
 “ indifferently) pray, that snow might lie
 “ long on the ground? the reason is, that it
 “ not only keepeth in, and encloseth the vital
 “ breath and soul (if I may so say) of the
 S “ earth,

* Manure for sain foin, see p. 87, article *Soot* of this treatise. Note, making hay, see *Winter Riches*, p. 125, sect. 4.

† *Rational Farmer*, second edition, p. 49 to 52.

“ earth, ready to exhale out and vanish away,
 “ and driveth it back again into the blade
 “ and root of corn, redoubling thereby the
 “ force and vigour thereof: but also, because
 “ it both yields liquor and moisture to it by
 “ little and little, and the same fine, pure,
 “ and passing light, as snow is nothing else
 “ but the foam or froth of rain water from
 “ heaven. This humour, therefore, not fall-
 “ ling forcibly all at once to drown the root,
 “ or wash the earth from it, (but distil-
 “ ling by degrees in that proportion and mea-
 “ sure as thirst requires and calls for it) nou-
 “ risheth all things, as from a teat or pap:
 “ nourisheth, I say, and neither drencheth
 “ nor overfloweth them. The earth also for
 “ her part, by this means well soaked, swells
 “ as it were, with a leaven, and lie thereby
 “ more light and mellow, this being full of
 “ juice and moisture itself, and not barren,
 “ well replenished with seeds sown, and plants
 “ suckled thus continually in her-womb;
 “ when the open time of the spring is once
 “ come to discharge her, she shews herself
 “ fresh and gay, and willingly entertains the
 “ warm weather of the season.” It is com-
 mon in our climate, for an open mild winter
 to be followed with a severe and hurtful spring,
 therefore it is necessary to have a good forecast
 for food.

Of the Quality of Dungs.

In respect to the quality of dungs, it may not be amiss to inform my reader, that dung differs in power, according to the nature of the food of one beast differing from that of another of a different species, though nourished with the same food. *

As the strength and power of any herb, dry or green, when putrified, out of a beast's body, so will such power in proportion be, † when putrified or digested by fermentation in the body of a beast; as soft weak grass, when laid in a heap to rot, must be weaker, and less in its oleose nourishment than grass rotted or putrified when in full prime of its oily juice.

Thus hay, as more or less replete with oily juice, at the time of cutting it, and manner of exsiccation, if putrified out of the body of a beast, will be in a proportion to those juices, when such are digested in a beast's body.

The like will hold good between exhausted straw, and the clammy glutinous hay, when putrified either in or out of the body of a beast, as that of the before mentioned grass.

For, as all grasses are most replete with salts and juice, when cut as they begin to bloom,
so

* See this treatise, p. 89, article *Neats Dung*. And *Rational Farmer*, second edition, p. 36.

† See *Winter Riches*, p. 109.

so such grass is more powerful, rich, and nourishing, than when those saline juices are not perfected, or are wasted by an imprudent over drying them. ||

I am of opinion, that there are more saline oily juices contained in natural putrefaction, than by an artificial one in the body of a beast, provided such vegetable be in its prime: but if its saline oily quality be lost, its nourishment to the beast is lost also, but at all times acquiring some new spirit from the nature of the beast.

When cattle are fed with green, or properly exsiccated food, or hay in its state of strength, there is no doubt but that the principal part of the purest spirit, or part of such, goes towards nourishing the beast, leaving the remainder as dregs; as in the case of distillation of vegetables, grain, &c. But what proportion of this spirit goes toward fattening the beast, or common feeding them only; or in what proportion the dregs or dung of such food, may be more or less impregnated by the saline nature of the beast, in passing through its body, I do not pretend to ascertain, nor can I learn from any information. However, my opinion relative to a preference given to the natural putrified vegetable, seems to be corroborated by what Columella and Sir Hugh Plat have said. The former observes, " That

" sixteen

|| See Winter Riches, p. 125, sect. 4.

“ sixteen bushels of lupines par-boiled, will
 “ manure an acre of land.” And the latter
 says, “ One load of grain will enrich ground,
 “ more than ten loads of dung.”

In the first mentioned case, the difference
 is in the food, not in the beast. The other
 in the beast, not the food. For example,

If a cow and horse be foddered on the best
 hay, yet the dung of the cow will be cooling,
 that of the horse heating.

Suppose again, that both the cow and horse
 are fed on the most exhausted substance, the
 quality of their dungs will, as before, differ
 in quality and degree of strength, as the nu-
 triment of such food may be more or less.

And thus all dungs differ in power and
 quality according to the quantity of oily
 juice so contained in the food, and the species
 of beasts so fed. †

In the following table, I have arranged the
 common foods, as they are in nourishment:
 of course also, dung must be admitted in the
 same proportion of value.

*A TABLE of Foods for Cattle, from the
 first or strongest, to the weak After grass, &c.*

Horses fed on vegetable Food. 1 Lucern and
 Sain foin, 2 Buck wheat. 3 Clover and
 vetches.

† The same in birds and poultry, as before mentioned,

vetches. 4 Hay. 5 Summer grass, and turn-
ips. 6 Pease haulm. 7 Barley straw. 8 Spring
grass. 9 After grass.

Horses fed on Grain, in Meal. 1 Wheat.
2 Buck wheat. 3 Rye. 4 Beans. 5 Vetches
and pease. 6 Barley. 7 Oats.

Horses fed on Roots bruised. 1 Carrots.
2 Parsnips. 3 Turnip rooted cabbage. 4
Turnips. 5 Potatoes.

Bullocks, &c. fed on Vegetables. 1 Lucern
and sain foin. 2 Buck wheat. 3 Spurry.
4 Clover and vetches. 5 Hay. 6 Turnips,
summer grass, and cabbages. 7 Pease haulm.
8 Barley straw. 9 Spring grass.

Bullocks on Grain, in Meal. 1 Wheat.
2 Buck wheat. 3 Rye. 4 Beans. 5 Vetch-
es and pease. 6 Barley. 7 Oats.

Bullocks fed on Roots bruised, or cut. 1 Car-
rots. 2 Parsnips. 3 Turnip rooted cabbage.
4 Turnips. 5 Dutch cabbage, &c. 6 Pota-
toes.

Hogs fed on Vegetables. 1 Lucern and sain
foin. 2 Clover. 3 Knot grass. 4 Buck wheat.
5 Turnips, and turnip rooted cabbage. 6 Dutch
cabbage, &c.

Hogs fed on Grain, in Meal. 1 Wheat.
2 Buck wheat. 3 Rye. 4 Beans. 5 Vetches
and pease. 6 Barley. 7 Oats.

Hogs fed on Roots boiled. 1 Carrots. 2 Pars-
nips. 3 Turnip rooted cabbage. 4 Turnips.
5 Dutch

5 Dutch Cabbage. 6 Jerusalem artichokes.
7 Potatoes.

Thus, the nourishment in the dung produced from each vegetable, or grain, is in proportion to the nourishment contained in such vegetable or grain.

I shall next give my reader a small table of the different degrees of nourishment contained in the dungs of poultry, four-footed beasts, &c., within our knowledge.

Dung of Poultry. 1 Pigeons. 2 Rooks.
3 Hens, &c. 4 Geese. 5 Ducks.

Dung of four footed Beasts. 1 Hogs, sheep, deer, or horses. 2 Bullocks, goats, or mules.
3 Rabbits.

And the urine of all preserved, and thrown among vegetables in a heap, or mixtions of any sort, will add much nitre to the dung.

Ordure of man is by some deemed the greatest enricher of land.

To conclude this subject; it is plain that different food alters the strength of dung in the same beast, and is corroborated by Pliny, who says, "That some praise the muck of all four footed beasts whatsoever, so they were fed with trefoil, called *cytissus*."

And, as a further confirmation, that the substance evacuated from an animal is in proportion

portion stronger or weaker, according to the strength or powers of the substance received into the body, Pliny, speaking of urine as an improver of land, has this remarkable passage: "Some that use urine (says he) mingle water with it again, * but in much greater quantity than they (whose urine it was) did put water to the wine when they drank it," viz. the urine evacuated by a man who drank pure wine, was stronger than the urine of a man who mixed water with his wine when he drank it.

From these considerations, it appears to me, that the herb in a beast's body arriving to a state of fermentation, its spirituous quality, from the alimentary part, is as it were distilled, and percolated through certain organs to the blood, &c. thus, the spirit or fluid called *chyle*, when it leaves the excrementous fermentation of the aliment, passes to the blood; from thence the urinary fluid is separated and secreted by the kidneys.

Hence also, the oily and nitrous juice of the vegetable, with which it is so replete, are necessary to answer the end of supporting, nourishing, and fattening the animal creation; leaving

* This must be proper, as the quantity of salts or nitre contained in urine, would be too burning or hot, if immediately used. Note, I hope my good intentions will plead in excuse with the faculty, for any inaccuracy in terms, in treating of the above interesting passage.

leaving the dregs or superfluous substance, that cannot be of any further use in the body, to be discharged from thence, called *dung*.

Thus we may in some measure account, how blood and urine contain, or are impregnated with salts in such abundance; as the spirit raised by fermentation, is the spirit of the aliment; so such spirit is the food or preservation of life, by its power of operating in these two grand parts of the animal oeconomy; namely, salts to support the blood, and urine to discharge the unnecessary salts.

It then follows, that considering the manner in which urine is thus raised and evacuated; it must be much impregnated with salts, and of course powerful in enriching land; this the ancients well knew, who preserved all the urine of man and beast, and threw it on their mixtions. To illustrate what has been said relative to urine, and its use as manure, permit me to relate what Dr. Lister and others have said on this subject.

Dr. Lister is of opinion, that in the digestion of meat in the stomach, there is made a separation, or solution of urinous salt, no otherwise than in the rotting of plants or animals: that the chyle is highly impregnated with this urinous salt; that it owes its whiteness to the fermentation it acquires from that mixture; that the salt chyle is conveyed into the venal blood, and with it enters the heart,

T

&c.

&c. The fabrick being considered, the heat of the circumambient parts, the pulsations of innumerable arteries, the great strokes of the aorta underneath, the constant compressions of the diaphragma and abdominal muscles, it must necessarily follow, that the finer parts of the aliment will be first expelled from the stomach; and that the grosser will remain, &c.

Dr. Morgan, mentioning two kinds of urine, the one filtrated immediately out of the stomach into the bladder, the other passing through the long course of circulation.

“ The physicians call urine a liquid excrement, or humour separated from the blood in the kidneys, and conveyed thence into the bladder: that urine is of various kinds and properties. After drinking plentifully of any aqueous fluid, the urine is crude, insipid, void of smell, and easily retained. That yielded by chyle, well concocted, is sharper, more saline, less copious, somewhat fetid, and more stimulating. That from chyle, already converted into serum, is redder, sharper, saltier, and more fetid and stimulating. And that secreted after long abstinence, from humours well concocted, and worn off the solid parts, is the least copious, is sharpest, saltest, reddest, most fetid, almost putrified, and of all others the hardest to retain. The urine, therefore,

“ therefore, contains the watery part of the
 “ blood, its sharpest, smallest, and most vo-
 “ latile salt, and that nearest to the alkaline
 “ kind; its sharpest, subtlest, and most vola-
 “ tile oil, and that nearest to putrefaction,
 “ and its smallest most volatile earth.”

Proficients in agriculture and gardening, prefer urine for land, trees, &c. before dung, as penetrating better to the roots, and removing divers infirmities of plants. In Holland, and divers other parts, they preserve the urine of their beasts, &c. with as much care as their dung. And Mr. Mortimer, Mr. Hartlib, &c. make a common complaint, that so great an improver of land, and so remarkable a strengthener of manure, should be so much disregarded among us. Mr. Mortimer also observes, that the ancient Kentish pippen is much decayed, and that they will be quite lost, unless persons set themselves to the old way of culture; which, as all ancient gardeners know, was by washing the mossy, worm eaten, cankered, and unsound trees, two or three times in the month of March, with the urine of oxen, &c. gathered in earthen vessels, placed under the planks of the stalls, wherein they were fattened.

To which permit me to add, that it is from this powerful liquid of man and beast, that sal amoniac, the phosphorus, and salt-petre are prepared: and it is evident, that u-
 rine

rine contains more salts than the dung of the beast, in a great proportion; as also that the dung of beasts hold no proportion in nutriment for land, with vegetables putrified in their full strength; which is also confirmed from the salts that abound so plentifully, when weeds are calined in pits, where the volatile part is not lost by evaporation. Merret Bauhin, and others, tell us, that instead of the plant kali already mentioned, so much in renown in Egypt, Syria, Languedoc, and Provence, for the use of making glass, on account of the salts therein contained, those of fern, the pods and stalks of beans, coleworts, bramble bush, rushes, millet stalked, thistles, nettles, and many other sorts, may be used, as they will yield a salt nothing inferior.

After all these corroborating testimonies, if man will continue deaf, his heart must be obdurate against conviction, and his principles imbrued in contumaciousness.

Of Blights affecting Corn.

In respect to blighted corn, various causes are assigned, and in general the farmer mistakes in all. *

A
* The fault is generally laid on the season, as was the case in 1774, when three men sowed pease, adjoining to each

A discussion on this important subject may be seen in my two former treatises. † Yet I must not here omit taking notice, what the ingenious and learned Dr. Tissot, and others, have said on the diseases of corn, and blights. This gentleman says, " There are three different disorders principally affecting bread
" corn and rye, mildew, smut, or black
" stricken, and horned rye, sometimes called
" *cockspurred rye*.

" Wheat is also subject to another distemper, which is called by our farmers, the
" *blight*; but, as that is a general term for
" all corn disordered in the field, this particular distemper ought to be described.

" The ear of wheat then has a wan attenuated aspect, as if it had not been properly fed or nourished; and the grains are
" small, contracted, and of a swarthy colour,
" not much unlike the horned rye; to which,
" if more minutely examined, it has likewise a further resemblance, as that seems
" to contain the same kind of animalculæ.

" The

each other, in an open field, the land equally good, and equally tilled; the middle part was blighted, producing no pease; the two outer parts were fine crops, which produced a sort of phenomenon, owing not to the soil, time of sowing, or season, but to the seed with which it was sowed, having not been changed for many years.

† Rational Farmer, second edition, p. 72 to 76, And Winter Riches, p. 129 to 136, and 192 to 196.

“ The discovery of a certain kind of an-
 “ guillæ, or animalculæ, resembling eels, in
 “ blighted wheat, was made accidentally by
 “ Mr. Tubeville Needham, in the summer
 “ 1743. These animalculæ, says Mr. Baker,
 “ in his *Employment for the Microscope*, are
 “ not usually lodged in such blighted wheat,
 “ whose grains are covered externally with a
 “ soot-like dust, (whose inside is frequently
 “ converted into a black powder) but abun-
 “ dant of ears may be observed in some fields
 “ of corn, having grains that appear black-
 “ ish, as if scorched; and such, when open-
 “ ed, are found to contain a soft white sub-
 “ stance, that attentively examined, seems to
 “ be nothing else but a congeries of threads
 “ or fibres, lying as close as possible to each
 “ other, in a parallel direction, and much re-
 “ sembling the unripe down of some thistles
 “ on cutting open the flower heads, before
 “ they blow. This fibrous matter discovers
 “ not the least sign of life or motion, unless
 “ water be applied to it; but immediately on
 “ wetting (provided the grains of wheat
 “ are newly gathered) the supposed fibres
 “ separate, and prove themselves to be living
 “ creatures, by motions that are first languid,
 “ but gradually become more vigorous, twist-
 “ ing, or wriggling themselves, without any
 “ uniformity in their motion, but bending
 “ their

“ their two extremities sometimes differently,
 “ and sometimes in the same direction.

“ The mildew then, called *rubigo* in La-
 “ tin, and *rouille* in French, and *ruginne* in
 “ Italian, is a reddish yellow powder, clam-
 “ my, and adhering to the tops or ears of
 “ many graminous plants, hindering their
 “ growth, so that the impoverished grain be-
 “ ing destroyed by an atrophy, is dried up,
 “ yielding little or no flour. This is the dis-
 “ ease, if I am not mistaken, which in
 “ some places is called *bledvante*, or *blasted*
 “ *corn*, and the country folks say, such corn
 “ is blasted, or that an hot wind has consu-
 “ med it.

“ Smut, or black striken, called *ustilago* in
 “ Italian, in French *mille*, or *brulure*, in La-
 “ tin *fuligine*, is a general term, signifying a
 “ black degeneracy of corn, of which there
 “ are two kinds, the carbuncle, or coal-burnt,
 “ and the carious, or rotten grain.

“ Carbuncle, or black striken, is a disease
 “ of corn scarcely to be discovered by the eye,
 “ except the grain has something of a preter-
 “ natural roundness in its shape; its inward
 “ substance is turned into a black, viscid,
 “ foetid dust: sometimes this corn is much
 “ bloached. Duhamel calls this disease *la*
 “ *basse*. † The nature of the carbuncle may,

as

† A bunch, or swelling.

“ as we are informed by Bonet, be best seen
 “ in the Indian corn, called *mayze*.

“ The caries, or rot, as it may be so called, usually attack wheat, barley, and some other grain; and not the grain only, but likewise the blade and blossom of the vegetable are infected, under the appearance of a black and viscid dust closely adhering thereto, and killing whatever it infixes. This disease most commonly invades the corn in bloom, and totally prevents its ever arriving at maturity, for I do not believe that the corn is ever attacked with this disease, after it comes to a perfect state. I have now several ears before me thus diseased, which are all smitten with this black dust, empty inwardly, only exhibiting a light coloured chaff, of a fibrous appearance in the middle flake, which seems to be the fibrous part, or stem of the grain.

“ The powder has little or no taste, and it had none when the ears were gathered.

“ This rot, or caries in corn, has been observed in all ages, as is thought by Ginna-
 “ ni, but the smut burnt, or black stricken, has been known only of late, never having
 “ been seen in Lombardy before the year 1730;
 “ and at Cevennes before the year 1738.

“ Horned rye, or the *ergot* of the French, is a disease in rye, different from the two former. Baron Haller says, that it is only
 “ rye

“ rye; and a few other graminous plants are
 “ infected with this evil.

“ Concerning the name; *horned rye*, there
 “ is not much confusion: with some it is cal-
 “ led *overgrown rye*; with others *spurred rye*,
 “ and *mother rye*; in the German it is named
 “ *mutterkorn*; in French *ergote*, but it can
 “ hardly be confounded with any other dis-
 “ ease incident to corn; it being a third sort,
 “ or species of disease;” but its description
 goes no further.

Doctor Tissot then goes on with an account
 of people disordered, by eating this diseased
 corn, in every country; but that being rather
 foreign from the present purpose, I shall omit
 it, and give his conclusion on this subject.

“ It is asked, What is the cause of this de-
 “ generacy in rye? Here (says he) we are in
 “ total obscurity. Mr. Almon has proved to
 “ a demonstration, the root or caries to be oc-
 “ casioned by the effects of the soil or situa-
 “ tion upon the seed grain; and promises;
 “ that he will extend his enquiries, to disco-
 “ ver the cause from which rye becomes horn-
 “ ed.”

Here I am led to a sentiment of Mr.
 Young, who says, “ That mildews arise from
 “ the luxuriancy of corn, * and luxuriancy

U

“ of

* Mildew is the natural effect, from pent up, or stag-
 nated air, which is always the case, when corn is too
 thick.

" of corn is occasioned by too often turning
" the soil."

Dung often causes luxuriancy of corn, well known by the most illiterate farmer, under the title of *too thick*, or *too much straw*, * not from too often turning the soil. The drill advocates, who rely on nothing else but fallow turning the soil, would be very happy, if such effect were produced by it; they find but little straw, therefore it cannot be too luxuriant.

The same author also says, " Corn being
" very liable to lodge, all addition of most
" beneficial manures, are sure in bad seasons
" to make the crop less valuable."

I confess I do not understand this doctrine of Mr. Young: How can beneficial manures be injurious? if injurious to crops, they cannot be good or beneficial, but quite contrary: and, if beneficial, or good manures, are not useful in bad seasons, When are they useful! good seasons require less assistance to the crops of the earth, than bad seasons, surely.

But let us examine into the nature of what Mr. Young calls *beneficial manures*.

This we shall find to be horse dung. Horse dung is his fort in farming: he tells us, that a man ought to be wealthy, that he may be
" able

* See *Horse dung*, and its effect, p. 62 of this treatise, and Duhamel, &c. on *Horse dung*, *Winter Riches*, p. 96.

able to purchase many horses, to procure a large quantity of dung: for without many cattle, he cannot expect much corn. †

If often turning of land superabundantly enriches it, so as to make it too luxuriant, and horse dung (his favourite) the beneficial manure, is sure in bad seasons to make the crop less valuable! would it not have been kind of him to have informed us of a substitute to make crops more valuable? and a remedy

† On the contrary, see what Duhamel says, *Winter Riches*, p. 112. Also Mr. Miller, under the article *Horse dung*, p. 60 of this treatise. But perhaps the Critical Reviewers may call the truth of this quotation in question, as they did in their Review for October 1771, where they so liberally discussed on *Winter Riches*. In the note, p. 13 of *Winter Riches*, I observed that Mr. Young was the only dissenter in opinion against turnips being good food for hogs, to which these Gentlemen Reviewers say, "We recollect in various of Mr. Young's works, particularly, *The Experimental Agriculture*, vol. II. that he mentions feeding his stock hogs commonly on turnips; what the author means, therefore, we do not understand." The latter part of this sentiment of theirs I can readily believe; and, if they had applied that good adage, *Read before you Write*, as mentioned in the above Review, to themselves, they would have found, that in Mr. Young's *Essay on the Management of Hogs*, &c. (for which he tells a gold medal was adjudged to him) p. 46, 47, that, of four pigs fed on turnips, three died, and the fourth was dying at the end of three weeks; and that turnips were wretched food. If Mr. Young contradicts himself, which they would insinuate, his gold medal was ill obtained; if otherwise, I leave Mr. Young and them to settle the matter.

remedy whereby the farmer might manure his land, so as to prevent luxuriance by horse dung, or often turning it? as he expresses himself.

The Grecians esteemed the goodness of corn, by the bigness of the straw, and attributed such to the goodness and richness of the soil; and therefore they prescribed to sow corn in fat ground, says Pliny.

Horse dung is frequently the cause of luxuriant corn, by its over abundance of straw, and of course is the cause of its lodging; especially when injudiciously sown too thick: too often turning the soil, or, in other words, well fallowing it, even without dung, if sowed too thick, will injure the crop also; but in neither cases, if corn be sowed thin, and the land be in a high state of improvement, one bushel of wheat sown to an acre, and one bushel and an half of barley an acre, there would be nearly double the common crop produced, and not too luxuriant, nor liable to lodge. †

The celebrated Mr. Miller says, "That thick, or close planting of fruit trees, most often occasions them to be blighted when in blossom."

I say

† Sowing thin, will prevent the evil complained of by Mr. Young. Other causes affecting corn, see notes, p. 95 of this treatise, and Dr. Tisson's *Narrative*, &c.

I say the same holds good in respect to corn, But there is another cause, something similar to sowing too thick; namely, when corn is sown in small valleys, or small inclosures surrounded with high trees.

For as valleys are more subject to be involved in mists than high exposures, so such mists arising in those valleys and inclosures, for want of a free circulation of air, corrupt, and become poisonous, infecting not only the blossom, but the whole plant.

Such also was the opinion of the renowned Pliny, who says, " This unhappy blast falls
" most frequently in places subject to mists
" and dews, viz. in hollow valleys, low
" grounds lying under the wind; for contra-
" riwise, windy quarters, and such as are
" mounted high, are not subject to this in-
" convenience. * Also, we may number a-
" mong the faults incident to corn, its rank-
" ness; namely, when the blade is overgrown
" with a weak stalk. †

In

* Vide p. 33 of this treatise.

† This must ever be the case, when land is overloaded by injudicious thick sowing, at a loss on the crop of at least half; and one bushel and an half on an average of seed thrown away *per* acre, at sowing; a quantity not less than 300000 quarters yearly, in the latter case, loss to the kingdom. And Mr. Miller says, that if the farmer would sow but half a peck, instead of one bushel of corn, he would have a much greater produce.

In respect to fruit trees, the same often happens as to corn, viz. an internal, as well as an external one. Corn may be blighted or injured from a small external cause, owing to an internal weakness in the plant, arising from the soil, or weak seed grain: that such weakness proceeds often from the soil, no man will deny; and that it often proceeds from the seed sown, and not in the soil, is evident also from the nature of degeneracy. By not only frequently changing the seed, which is so absolutely necessary to prevent degeneracy, but such care also is as necessary for the well being of the ensuing crop, to clear such seed of weak and improper grains. †

Mr. Miller says, " Blights are often caused by a continued dry easterly wind for several days together, without the intervention of showers, or any morning dew, by which the perspiration in the tender blossom is stopped; so that in a short time their colour is changed, and they wither and decay; and if it so happens, that there is a long continuance of the same weather, it equally affects the tender leaves; for their perspiring matter is thereby thickened, and rendered glutinous, closely adhering to the surface of the leaves, and becomes a proper

"nutri-

† See the whole passage, p. 43, on the choice of seed wheat, in this treatise.

“ nutriment to those small insects, which are
 “ always found preying upon the leaves and
 “ tender branches of fruit trees, † whenever
 “ this blight happens.” ‡

“ Another cause of blights in the spring is,
 “ sharp hoary frost, that is often succeeded by
 “ hot sunshine in the day-time; which is the
 “ most sudden destroyer of fruits that is
 “ known: for the cold of the night starves
 “ the tender parts of the blossoms, and the sun
 “ rising hot upon the walls, before the moi-
 “ sture is dried from the blossoms (which be-
 “ ing in small globules, collect the rays of the
 “ sun) a scalding heat is thereby acquired,
 “ which scorches the tender flowers, and o-
 “ ther parts of plants.

“ But that blights are frequently no more
 “ than an inward weakness or distemper in
 “ trees, will evidently appear, if we consider
 “ how

‡ Frequent showers are of great service at such times. Mr. Miller observes, in rain there are two distinct properties, the one which serves for the dissolution of the salts of the earth; and the other a terrestrial matter, which it meets with in its sublimation, which may, with some propriety be called either salt or nitre: and both these are useful in the business of vegetation. Rain is operative in dissolving the salts that are in the earth; and also cools and bathes the cortex, or skin of all vegetables; and by a sort of relaxation, causes the sap to pass up more freely, and by that means the tree to grow and shoot the better.

† Such is often the case with the ears of wheat; I have seen the ears covered with a small green insect, like those which affect pease particularly in the summer 1772.

“ how often it happens, that trees against the
 “ same wall, exposed to the same aspect, and
 “ equally enjoying the advantages of sun and
 “ air, with every other circumstance which
 “ might render them equally healthy, yet ve-
 “ ry often are observed to differ greatly in their
 “ strength and vigour; and as often do we
 “ observe the weak trees to be continually
 “ blighted, when the vigorous ones in the
 “ same situation shall escape very well; which
 “ must therefore in a great measure be ascri-
 “ bed to their constitutions. This weakness
 “ in trees proceeds either from a want of suf-
 “ ficient supply of nourishment, to maintain
 “ it in perfect vigour, or from some ill qua-
 “ lities in the soil where it grows, or perhaps
 “ from some bad quality in the stock, or in-
 “ bred distemper of the bud or cyon, which
 “ it had imbibed from its mother tree, or from
 “ mismanagement in the pruning, &c. All
 “ which are productive of distempers in trees,
 “ and which are with difficulty cured.”

Thus we have various causes assigned; a-
 mounting to, winds, frost, soil, and inbred di-
 stempers: the two first acting externally only
 at sometimes, and both internally and exter-
 nally at other times; and the third internally
 alone, which brings on distempers not reco-
 verable: being of opinion with Pliny, that
 barrenness in fruit trees, most often proceeds
 from a cause prior to the time of blos-
 soming.

soming. This author observes, " that if the wind stands north east in winter, nothing is so good generally for all trees and fruits of the earth. And really a good shower now and then during that time, will do no harm; and that men wish for rain then, the reason is evident: trees, by bearing fruit, are drawn dry, and have lost their natural moisture; with shedding their leaves they are poor and feeble; so that it is kind for them to be hungry then, and to have a greedy appetite to new food, which is in rain. † Now if the winter be open and warm withal, that so soon as the trees have done bearing, they rest not between, but conceive again presently upon it (that is to say) bud and spurt anew, and fall afresh to blossom, whereby they have another evacuation that way also, to spend their sap and radical moisture, we find by experience, that there is nothing in the world so bad for them; nay, if many such years come together, the very trees themselves will die, for who can look for better, when they are thus pinched and furnished."

And Virgil says, " Whosoever he was that said husbandmen were to wish for a fair winter; surely he was no friend to trees, nor ever prayed for them."

X

Hence

† Vide the preceding note.

Hence it is manifestly indicated, that there are causes which affect the plant, previous to the time of blossoming, as well as an open warm winter, by an unseasonable force of nature, weakening thereby the constitution of the plant, &c. so much, as to render it unable to perform its office in due season.

From all which I shall conclude, that there are but few cases wherein the weather alone is the real cause of blights, at the time of blossoming, notwithstanding the general complaint in this case against the benevolent disposer of all things.

Of the Juice or Sap of Plants, so far as it relates to the present purpose.

The containing parts of plants, are acknowledged to be vessels consisting of mere earth, connected or bound together, as it were, by a glutinous oil, which continuing in due circulation, life is preserved; but this being exhausted by age, fire, or air, &c. the plant moulders, or returns again into its earth or dust.

Earth, the great mother of all, furnishing the plant with a moisture or sap, being changed therein, consists of fossile parts; other parts are derived from rain, air, putrified plants and animals;

animals ; therefore in vegetables are contained all kinds of salts, earth, water, oil, &c. †

Doctor James says, " That the herb *persicaria*, commonly called *arfe-smart*, by a chymical analysis, yields a great deal of acid oil and earth, &c.

" That oil of vegetables chiefly abounds in their more durable parts, in order to defend the other natural and more necessary ones ; and is therefore found in such plants as are farthest removed from the absorbing vessels of the roots, and the nutrimental juice there drawn in from the earth : thus more oil is found in the ripe lin-seed, than perhaps in all the other parts of the plants together.

" Arse smart, called also *lake weed*, *water pepper*, &c. has a very acid and burning taste, and gives a lively tincture of red to blue paper. It is full of acid, sulphur, and earth ; its salt resembles that which results from the mixture of the salt of coral with the sal ammoniac, loaded with a great deal more acid than ordinary, and a little volatile concrete salt." He adds, " There is nothing found more effectual for expelling the flies : for whatever wounds or ulcers in horses

† A manifest proof, that vegetables in their perfection are fully replete with the greatest nourishment for land, when used as manure.

"horses or cattle are rubbed with the juice of
"arse smart, they remain secure from the in-
"juries of the flies.

"We often find the oil, juice, &c. collec-
"ted in such quantity, as spontaneously to
"appear in the summer; and in the winter
"the roots of some plants which lose their
"stalks and leaves, will be found rich in
"juice."

This short account fully proves the constitu-
ent parts of the juice of plants, and is sufficient
for the present purpose, viz. well fitted as
manure; it is unnecessary to say any thing fur-
ther on the subject, only to remark, that I
presume it is in some respect corroborating the
propriety of my experience of the vegetable
system.

Of Fellon Drink.

This is a drink so called by the reverend
Richard Wallis, curate of Carham, † which
he used as a cure for a hoven calf, or swelling
in the body.

This gentleman, in a letter to the editors
of the *Museum Rusticum*, recites, that a calf
of his had been often afflicted with a swelling
in the body, from catching cold, ‡ and tap-
ping

† See a Letter to the Editors of the *Museum Rusti-
cum*, October 30. 1764, No. 66, vol. 3. p. 301.

‡ See Winter Riches, p. 252.

ping the calf five times with equal success, says, " Upon this I had a vein opened, and the blood was, as I expected, thick, and had scarcely any serum in it, but resembled that of a person in an ague; hence I thought a fellon drink, such as is generally used, would carry off the distemper altogether."

" Such a one I made, and gave it; the calf has never had any return of the swelling since, &c."

Why Mr. Wallis calls it *Fellon Drink*, or what its composition is, I have not been able to learn, although the closest inquiry has been made among the first gentlemen of the faculty.

But I am apt to believe, that the herb from whence Mr. Wallis made this drink, is fellow-wort, gentian, or bitter wort, its specification being agreeable to the use he applied it to, namely, an aguish blood, or some similar disorder.

Doctor James says, " There are three generic kinds, and nine species of fellow-wort; four of which are English, and five foreign plants; but the qualities and virtues are said to be the same; but that the foreign is most powerful, although the English may be well used."

" Salmon says, the juice of the herb is given to cattle to drink, to free them from the bots and worms, and many other diseases;

cases; as also, when they begin to swell, † being poisoned by any venomous thing, which they often lick up with the grass; as also, when any venomous creature has bitten a cow by the udder, or any other tender part, which thereupon presently swells, and puts it to pain, making them forbear their meat; with this juice the place bitten is immediately to be bathed several times, and five or six spoonfuls of the juice to be given inwardly, mixed with a pint of ale; by these means the poor beast is quickly cured, and restored to its health."

There is indeed a disorder, or breaking out at the end of the fingers, or root of the nails, which is often very troublesome, called a *felon sore*, or *whitlow*. In Latin *furunculus*, a little thief, *felon*, and *ferret*. And *Paronychia*, a felon, or whitlow, or whitlow grass. Hence, there being no such herb as felon, but an herb called *fel wort*, which is applied to the use Mr. Wallis described, and the sore called a *felon sore*, or *whitlow*, being cured by an herb or grass called *whitlow grass*, which has not the quality of *fel wort*, manifestly shews, that Mr. Wallis was mistaken in the name.

This felon drink, mentioned by Mr. Wallis, being relative to hoven cattle, I thought

† This confirms, that the drink made by Mr. Wallis, must have been made of *fel wort* or *gentian*.

it would not be improper to clear up a mistake of so interesting a nature, as soon as I had it in my power; as, in treating on the subject of hoven cattle in *Winter Riches*, postscript, p. 245, it was there omitted, I being not then fully informed of this matter.

*Some Remarks on the Loss England sustains,
when Exportation ceases.*

It appears by p. 40, that the average growth of wheat in England, from the year 1697, to the year 1765, amounted to 4050771 quarters yearly. The consumption of which, on an average, was 3840000 quarters, and the export average 210771 quarters, at a medium price of 1 l. 12 s. 6 d. *per* quarter, at an yield of upwards of twenty four bushels one peck *per* acre. † The export sum, on an average of years, amounted to 342502 l. 6 s. 3 d. making a sum in the sixty eight years, of 23298157 l. 5 s. equal to more than half the

† An average *per* acre of 1333333 acres, being the average number under wheat, in the year 1697, viz. 1066666 acres, and the number of acres under wheat in the year 1765, viz. 1600000. See *Rational Farmer*, second edition, p. 123. But in the year 1765, the growth of wheat was not equal to the average consumption; so that 1600000 acres did not produce but little more than nineteen bushels six quarts *per* acre.

the national debt; a bounty of 5 s. *per* quarter on export was granted in the year 1689, when wheat was under 12 l. a load. Hence we may give a Table of Calculation, whereby the increase of one bushel *per* acre, to twelve bushels, will gradually appear, beginning the first bushel increase after twenty bushels *per* acre, the common produce; which will make 360000 quarters for export, being 200000 quarters more for export than an yield of twenty bushels *per* acre, and a sum of 325000 l. on an increase of one bushel *per* acre, as appears in the Table, by the difference in value of twenty bushels and twenty one bushels.

The

THE TABLE.

From 20 bushels per acre, the yield or produce at an average, from 1 to 12 bushels proportionably increasing.	Growth of wheat on 1600000 acres in quarters. Being the number of acres supposed to be under wheat.	Quarters of wheat for exportation yearly, when 20 bushels to 32 are produced yearly per acre.	Value, at 11. 12s. 6d. per quarter, from 20 to 32 bushels per acre.
0.20	4000000	160000	260,000
1.21	4200000	360000	585,000
2.22	4400000	560000	910,000
3.23	4600000	760000	1,235,000
4.24	4800000	960000	1,560,000
5.25	5000000	1160000	1,885,000
6.26	5200000	1360000	2,210,000
7.27	5400000	1560000	2,535,000
8.28	5600000	1760000	2,860,000
9.29	5800000	1960000	3,185,000
10.30	6000000	2160000	3,510,000
11.31	6200000	2360000	3,835,000
12.32	6400000	2560000	4,160,000
Every bushel of yield is 200000 quarters on the whole.			325,000 l. on every bushel increase, the difference between 260,000 l. and 585,000 l.

Y By

By this table 4000000 quarters being an average produce from 1600000 acres, and the consumption being computed to be 3840000 quarters*, there will remain 160000 quarters for exportation, equal to 200000 l. per year, as per first article.

And an average produce of 32 † bushels per acre, would give 6400000 quarters, and of course give 2560000 quarters of wheat for exportation, equal to a sum of 4160000 l. yearly, at 1l. 12s. 6d. per quarter, as per the last article.

But, allowing even the average produce as laid before the parliament in the year 1706, ‡ the loss to the kingdom, for want of wheat to export, is 366668 l. 1s. yearly, and this has been the case since the year 1768, which, with 1775 inclusive, makes a loss of 3966676 l. 7s. in those seven years, notwithstanding the bounty on exportation, when wheat is under 12 l. per load, viz. 5s. per quarter §.

This

* This has been the produce per acre for seven years past, being not more than home consumption.

† This ought to be the average growth at this time, according to the additional third of land under wheat more than was in the year 1697, if knowledge increased with the addition of land.

‡ Rational Farmer, second edition, p. 125.

§ An export bounty is now needless, as the farmer has no more lay land to break up; I would therefore rather recommend a bounty to be given for reducing the number of acres under tillage, in the present farms, that the remainder may be better tilled.

This short account I hope may be sufficient to open the farmer's eyes, and convince him what a loss he sustains by the late and present scarcity of corn, and thereby stimulate him to improve his genius in the field, and recover the worn out constitution of his land; if not, I hope the following calculation will.

The increase or decrease of wheat per acre, though it may be but small, is a matter of much consequence to the farmer, as well as to the community at large; I say, of much more consequence than in the light it is generally conceived by him.

The farmer, who seldom makes any calculations of gain or loss, by plenty or deficiency of crops, of course cannot form any conclusions relative thereto.

I shall therefore, for the sake of giving information to those who are desirous to be improved in so necessary a part of the duty each owes to himself in the occupation of husbandry, shew what a small difference of produce in each cock makes to the farmer's private advantage; and of course to the public in general, in the following table;

THE

THE TABLE.

Cocks or Hides & Acres.	Produce on each Cock or Hide, in Bushels, Pecks, Gallons, Pottles, and Quarts.					Produce on each Acre, in Bushels, Pecks, Gallons, Pottles, and Quarts.					Increase Value per Acre, at 11. 12s 6d. per Quarter.				
	B	P	G	P	Q	B	P	G	P	Q	L.	s.	d.	qr	Tents
18	1	0	0	0	0	18	0	0	0	0	3	13	1	2	
18	0	0	0	0	1	0	2	0	1	0	0	12	3	1	.674
18	0	0	0	1	0	0	0	1	0	0	0	4	6	3	.348
18	0	0	1	0	0	0	1	0	0	0	0	9	1	2	.696
18	0	1	0	0	0	0	2	0	0	0	0	18	3	1	.392
18	0	2	0	0	0	0	0	0	0	0	1	16	6	2	.784
18	0	3	0	0	0	0	2	0	0	0	2	14	10	0	.176
18	0	4	0	0	0	0	0	0	0	0	3	13	1	1	.568
19	1	0	0	0	0	19	0	0	0	0	3	17	2	1	
19	0	0	0	0	1	0	2	0	1	1	0	2	4	3	.767
19	0	0	0	1	0	0	0	2	1	0	0	4	9	3	.534
19	0	0	1	0	0	0	1	1	0	0	0	9	7	3	.68
19	0	1	0	0	0	0	3	0	0	0	0	19	3	2	.136
19	0	2	0	0	0	0	2	0	0	0	1	18	7	0	.272
19	0	3	0	0	0	0	1	0	0	0	2	17	19	2	.408
19	0	4	0	0	0	0	0	0	0	0	3	17	2	0	.544
20	1	0	0	0	0	20	0	0	0	0	4	11	3	0	
20	0	0	0	0	1	0	2	1	0	0	0	2	6	1	.860
20	0	0	0	1	0	0	1	0	0	0	0	5	0	3	.720
20	0	0	1	0	0	0	2	0	0	0	0	10	1	3	.440
20	0	1	0	0	0	0	0	0	0	0	1	0	3	2	.880
20	0	2	0	0	0	0	0	0	0	0	2	0	7	1	.760
20	0	3	0	0	0	0	0	0	0	0	3	0	11	0	.640
20	0	4	0	0	0	0	0	0	0	0	4	1	2	3	.520

Thus,

Thus, 18 cocks per acre of eleven sheaves per cock, at one bushel per cock produce, being 18 bushels per acre, at 4s. three farthings per bushel amounts to 3l. 13s. 1d. half-penny per acre value, * which acre increases in value according to the yield increasing, as set forth in the table, till it arrives to double, viz. 2 bushels per acre; the 1st and 8th article added together, or the first doubled, is the amount per acre at two bushels per cock, viz. 7l. 6s. 2d. † And by the second article the increase of one quarter per cock, is 2s. 3d. farthing per acre ‡, perhaps one fourth of the rent of such acre. The same proportion goes on under the article of 19 cocks, &c. and 20 cocks in the same proportional increase, to 20 cocks per acre, and two bushels per cock.

The real cause of such deficiency in the produce of corn, is owing to over dunging some land, and too much impoverishing other land; § the first producing much straw and little corn, the latter, black grass and weeds, little straw and less corn.

The farmer says, the rent is so high that he must continue sowing, and cannot pay his rent

* See * in the table.

† Vide † in the table.

‡ vide ‡ in the table.

§ If land be properly managed, there would be no cause of such complaint; for as *Columella*, observes, That the earth and nature is always the same.

rent unless the plough goes; and corn yielding such a high price, he cannot forbear, even if his state or situation in his farm would permit him.

Thus, most part of the pastures being broke up in the corn country, and all nearly worn out, the growth of corn is diminished; which, in all probability will be more and more the case, till an universal failure, already dreaded, shall ensue.

But, to discover a disease without mentioning a cure, would be only adding affliction to the afflicted; this I shall endeavour to obviate, by offering two remedies; one of which is undoubtedly *salutary* without any difficulty attending it; the other also *salutary*, though attended with many *difficulties*.

The first then being *salutary* without difficulties, is entirely in the farmers power; let him change the mode or custom of tillage; change his horse-dung manure, banish half his horses, cherish the ox, and lay aside summer fallows*, following the vegetable system as laid down in my *Rational Farmer*, and *Winter Riches*— and the cure is effected.

The second, being also *salutary*, but attended with opposing difficulties, is no less true than the former. Let the tenant rest his land for 10 years, after leaving it in good heart for

* Except it be to clean his land from the effects of dung, or slovenliness.

for that purpose, sowing in rotation, till the remainder well, the cure will then be also effected. But how this is to take place, opens to us an almost insurmountable difficulty! as then the landlord must lessen his rent, say they.

Ought not self-preservation to be preferred to avarice? Should not prudence take place, and luxury be abolished? Should not 3s. per acre for land, comparatively speaking, having it restored to a state of credit, be taken, rather than continue an obstinate demand of 10s. nay 20s. per acre, and have it, tenant, and landlord bankrupt? surely there can be no other alternative, no other choice of determination; the crisis is approaching, and one or the other must, according to the present appearance of things, inevitably take place, every thing hastening to contribute thereto.*

Permit me also to caution, both the landlord, and tenant, against suffering themselves to be lulled into hopes of security, by a now and then middling crop of corn from a particular fine or favourable season; it is not one middling crop in five or six years will bring us into a state of plenty; neither will one good crop, and two bad ones relieve us: middling

* If rents be lowered, luxury of course will be retrenched. Divide again the farms, population, and industry in tillage will once more flourish.

middling crops will only keep our heads just above water, but it must be good crops that can make the whole body float. Hence, a series of bad crops, must sink the whole fabrick.

Let me also once more repeat (among many other inconsistencies the tiller of land is too frequently guilty of, whereby light ears of corn are so often seen) the error of feeding down wheat in the spring, on which, altho' I have a little expatiated on in my former books, yet as the subject is very interesting, I cannot avoid using my best endeavours to set the bad consequences of such practice in the truest light, from experience, reason, and ancient opinions or authority.

I shall here recite the words of the celebrated *Georgic*, *Virgil*, who says, "Why should I speak of him, who, least the heavy ears should weigh down the stem, feeds down the luxuriant corn in the tender blade, as soon as it is even with the furrow?"

Since then, if feeding down wheat in the spring prevents a heavy ear, a light ear must be the consequence, and difference to the farmer, in a proportion of, a heavy crop of wheat, to a light crop.

This feeding down wheat in the tender blade, is, "the luxuriant corn," as *Virgil* calls it, thereby weakening it so much, by unnaturally

unnaturally forcing the plant to throw out more shoots or stalks, than it can bear; which of course must effectually injure the crop, by causing a greater number of unnatural weak stalks, and smaller ears.

The consequence of such feeding is attended with much impropriety and mischief, namely, causing luxuriance to produce unnatural weakly numbers, by which closeness of stalks or stems, with their weakness, blights, mildews, &c. must ensue.

The ill effects of rich land, improperly applied, and luxuriance of corn, with conclusive rules to remove the same, has been fully treated on in my two former publications, where my reader will find, that he is to sow thin in good land, that the corn may be thick and strong; not to feed with sheep either thick or thin wheat to make it thicker, as it renders the whole weaker when such artifice is used; sow thin, it will stock from nature as much as the land is able to bear, according to the various proportion of nutriment contained; and corn that may be luxuriant when sowed thick, would be only strong when sowed thin.

And here let me observe, that although it be a common custom in some counties to cut large quantities of wheat-straw for working horses at a price of one halfpenny per bushel, or a man cutting 50 bushels a day, yet it
Z
seems

seems doubtful whether most part of the straw and labour be not thrown away. Wheat-straw cut may assist in filling the beast, but its nourishment to a working beast is like water to a laborious man.

Such straw strewed over pasture in the winter, whether it be light or wet heavy soil, much warms and enlivens * it; the weak grass of such is thereby protected from inclement weather, and in the spring the straw is sucked into the earth by worms, which appear more numerous under such covering, and this is an encouragement to them to throw up much more worm casts, as so called, which being from time to time poled, is a renewal of nourishment as well as a good precaution to prevent the growth of moss, which such land too much abound with; and instead of insipid cut straw, feed with carrots, &c.

APPENDIX.

* The author is not ashamed to apply the word *enliven* to any substance that warms or invigorates the earth; and with great deference to the Critical Reviewers, he recommends a Review of a weak insinuation against that word in their Critical Review for October 1771.

A P P E N D I X.

Some Remarks on DEPOPULATION.

AS keeping land under tillage in small farms requires more hands than in any other manner of employing it; and as, by monopolizing farms, and dearness of provisions, thousands are yearly emigrating*, and thereby depopulating the kingdom, it may not be improper to make some remarks on that subject. As the increase of farms must promote population, the addition of 12212 farms, be it more or less, arising from the reduction of the forests, chases, and heathy wilds into such culture, will be the means of employing those people at home, who must out of necessity, otherwise seek for bread abroad.

In a former treatise † I endeavoured to explain my opinion on this subject, but however imperfectly it might be there discussed, yet I have the satisfaction since that time to find

* As for example to North-America, where, for some centuries to come, they will be well received; as, there is land, but not hands in proportion to cultivate so extensive a country.

† *Rational Farmer*, 2d edit. See, Essay on the cause of dearness of corn, &c.

find those sentiments well supported by an able writer.*

As I look on the monopolizing of farms to have been the cause of most of our present distresses, permit me to refer to a few years back, where we shall find a similar situation of the renters of land, the manner of occupying it being only reversed.

Near 300 years ago, the reigning passion was for pasture land, and tillage nearly exploded. The present passion is, all for tillage and to explode pasture.

I say, a similar mode of monopolizing has heretofore been practised, but removed by parliamentary interposition, as appears by an act of parliament made in the 4th of *Henry VII.* 1489, relative to converting arable land into pasture. And one in particular for the *Isle of Wight*. The preamble to which runs thus:

“ That forasmuch as it is to the king, &c.
 “ great surety, and also the surety of this
 “ realm of *England*, that the *Isle of Wight*
 “ be well inhabited with *English* people, &c.
 “ The which *Isle* is lately decayed of people,
 “ by reason that many towns and villages
 “ have been beaten down, and the fields
 “ ditched,

† *Dr. Davenant.*

“ ditched, &c.* And many dwelling places,
 “ farms and farm-holds taken into one man’s
 “ hands, that of old time were wont to be
 “ in several households, and thereby much
 “ people multiplied, and the same *Isle* there-
 “ by well inhabited; the which now by the
 “ occasion aforesaid, is desolate, and not
 “ inhabited, but occupied with beasts and
 “ cattle; so that if hasty remedy be not
 “ provided, that *Isle* cannot be kept and de-
 “ fended, but will be open and ready to the
 “ king’s enemies, which *God* forbid:—
 “ For remedy whereof it is ordained, &c.
 “ That from henceforth no manner of per-
 “ son of what estate, condition, or degree
 “ he is, or shall be, take any several farms
 “ more than one, of any manors, lands and
 “ tenements, parsonages and tythes, within
 “ the said *Isle*, whereof the farm of them
 “ altogether shall exceed the sum of ten
 “ marks † yearly, &c. And if any per-
 “ son do any thing contrary to this act, that
 “ then the lessee in that behalf shall forfeit
 “ to the king, for every such taking, ten
 “ pounds.”

And

* The remains of those ditches are yet to be seen in
 many downs in *England*. After which act of parliament
 many of the downs, &c. were thrown into tillage for
 some time; then laid under pasture, and now converting
 into tillage again.

† 6l. 13s. 4d.

And in the 25th of *Henry VIII*, 1534. An act was made whereby the number of sheep was ascertained that one man should keep.* The 14th section enacts, " That no manner
" of persons, after the feast of the nativity
" of our *Lord*, shall receive or take in farm
" for term of life, years, or at will, by in-
" denture, copy of court-roll or otherwise,
" any more houses or tenements of husbandry,
" whereunto lands are belonging, above two
" such holds or tenements. And that no
" manner of person shall have or occupy any
" such lands so newly taken, to the number
" of two, as is before expressed, except he
" or they be dwelling within the said parishes
" when such holds be taken, &c."†

And Sir *Thomas Moore*, who wrote on the situation of *England* about the aforesaid time, is so severe, as to call the sheep, *devouring creatures*, being the most voracious and dangerous brutes that were in *England*, not only devouring men, says he, but whole houses and towns.‡

Hence, monopolizing of farms, has heretofore been found to be as hurtful to the community

* This was fixed to 2000, six score to the hundred; and lambs not to be counted sheep until the second *Midsummer* after lambing.

† Under a penalty of 3s. 4d. a week.

‡ On account of the numbers then kept.

community in pasture extreme, as is the tillage extreme, our present grievance.

In England, where the inhabitants live so much on wheat bread, and flesh meat, an extreme of pasture culture, or of tillage, must respectively cause a want of one or the other. If an extreme of pasture be allowed, depopulation must be the consequence, even though monopolizing should not much prevail, but more so, if monopolizing of farms be continued.

As the first of these has been proved by an interposition of parliament, as just related, so the second, or present case, is confirmed from our own knowledge, and corroborated by the opinion of able writers. Dr. Price * says, that luxury and engrossing of farms are two unquestionable sources of national depopulation and misery.

As to the first, the inhabitants of a kingdom living in a state of luxury, must be an enervated and debilitated people, full of poverty and venality. And as to the latter, engrossing of farms, Mr. Muret observes, that a large track of land in the hands of one man, does not yield so great a return, as when in the hands of several, nor does it employ so many people: to prove which, he instances two parishes in the district of *Vaud*, one of which

* See Observations on Reversionary Payments, &c.

which (once a little village) having been bought by some rich man, was sunk into a single demesne, and the other (once a single demesne) having fallen into the hands of some peasants, was become a little village.

These observations, would we but look impartially round us, we may see verified in many similar cases; nay, almost in every parish, by the engrossers and holders of large tracks of land: and, similar to which, is an observation of Mr. *Susmilch*: "Only revive," says he, "the law of *Licinius*, where no Roman " was to hold more than seven jugera of land; " Or that of *Romulus*, which limited every " Roman to two jugera; and you will soon " convert a barren desert into a busy and " crowded hive."

The growing evil of engrossing farms, is spreading itself every day; † nay, even those engrossing lease holders, not content with holding four or five farms of consequence, but envies the life holder of his little bargain; what a pity it is, say they, that these little farms are in the way—they spoil this farm of mine.

The

† It is thought the engrossing of farms, by the opulent men in some part of Ireland, has been the principal cause of the insurrections in that kingdom for some years past.

The political writer, Dr. *Devriant*, tells us,
 "That at Michaelmas, in the year 1685, it
 appeared by a survey of the hearth books, *
 that the number of houses in all England
 and Wales, was 130000 of which 554631
 were houses of only one chimney, and the
 number of houses in 1690, was 1319215.
 At the Restoration, it appeared by the same
 hearth books, that the number of the hou-
 ses in the kingdom was 123000. In the
 interval, therefore, between the Restoration
 and the Revolution, the people of England
 had increased above 30000: And of smal-
 ler tenements, & the same gentleman ob-
 serves, there had been from the year 1666,
 to 1688, about 70000 new foundations
 laid. But in 1759, the number of houses
 in England and Wales was only 986482;
 of which not more than 330000 were cot-
 tages, having less than seven windows. In
 1766, notwithstanding the increase of build-
 ings in London, the number of houses was
 reduced to 980692. According to these
 accounts then, our people have, since the
 year 1690, decreased near a million and a
 half. And the waste has fallen principal-
 ly on the inhabitants of cottages; nor in-
 deed, into the state of depopulation in the king-
 dom, promote agriculture, drive back the
 * At this time there was a tax of 2 s. on every fire
 hearth; which was taken off at the Revolution, and a
 window tax established.

deed could it fall any where more unhap-
 pily ; for, from cottages our navies and ar-
 mies are supplied, and the lower class of
 people are the chief strength and security of
 every state. — What renders this calamity
 more alarming is, that the inhabitants of
 the cottages thrown down in the country,
 fly to London, and other towns, there to
 be corrupted, and perish. I know I shall
 be here told that the revenue thrives. But
 this is not a circumstance from which any
 encouragement can be derived ; since it
 thrives by a cause that is likely in time to
 destroy both itself and the kingdom ; I
 mean, by an increase of luxury, producing
 such an increase of consumption and im-
 portation, as secretly accelerates ruin, while
 at present (as far as the revenue is concern-
 ed) it overbalances the effects of depopula-
 tion. But what remedies can be applied
 in such circumstances ? This is a question
 of great importance, which requires a more
 deep and careful discussion than I am ca-
 pable of giving it ; I will therefore an-
 swer generally and briefly in a style and
 language similar to that of Mr. *Mars*.
 Enter immediately into a decisive enqui-
 ry into the state of population in the king-
 dom ; promote agriculture ; drive back the
 inhabitants of towns into the country ; e-
 stablish some regulations for preserving the
 lives

" lives of infants; discourage luxury and ce-
 " libacy, and the engrossing of farms; let
 " there be entire liberty; and maintain pub-
 " lic peace by a government founded not in
 " constraint, but in the respect and the hearts
 " of the people. But, above all things, if it
 " be not too late, find out the means of avoi-
 " ding the miseries of an impending bank-
 " ruptcy, and of easing the nation of that bur-
 " den of debts and taxes under which it is
 " sinking. -- But I am crying in vain; cor-
 " ruptions and follies of the worst sort have,
 " I am afraid, taken too deep root among
 " us."

According to Dr. Price's estimate of the
 number of people in England and Wales, it
 appears " that five persons is an allowance
 large enough for each house in London,
 and too large for England in general. That,
 if the number of houses be stated at one mil-
 lion in England and Wales, the number of
 people will be four millions and a half, allow-
 ing four and a half to a house, and five mil-
 lions allowing five to a house; (observing that
 the former is probably too large an allowance)
 but the latter is certainly so. The number of
 people in the kingdom may therefore be stated
 as probably at not more than four millions and
 an half, but certainly not five millions." †

To

† In the year 1685, the inhabitants were 6200000
 allowing 4½ to a house, from which deduct the present
 5000000, the loss will be 1200000.

((1801))

To these curious observations, I shall sub-join the following remark: that in one parish, since the year 1710 to 1773, there were fifty farms engrossed into other farms of that parish. In another parish, the farms were reduced from twenty-eight to eleven in thirty years. And in a third, since the year 1704, to the year 1764, the farms were reduced from seventeen to six, five of which had a thousand acres in other parishes.

Hence it follows, that as engrossing of farms has been universal, we may draw some sort of conclusion relative to depopulation in general, in the country at least, from the above monopolies in these three parishes.

The average redugement of farms, from those three parishes, will amount to twenty six. The number of parishes in England being 9098, and in Wales 751, makes 9849, these being multiplied by the average of 26, amounts to 256074 farms; and, if we allow but 4 people to each of these little farms, the industrious number drove from thence will appear to be no fewer than 1216351, which comes nearly to Dr. Price's estimate.

Lastly, if to the diminution of small farms, we add the diminution of cottages from the year 1685 to 1759, viz. 216631, as before mentioned by Dr. Davenant, the loss of one million and a half of people cannot appear strange. And by comparing the diminution

of

of houses at large from the year 1690, to the year 1766, namely 338523, the diminution of small farms, as well as depopulation, will appear very striking; and one would be inclinable to believe, that this account of *Dr. Davenant* and *Price*, is sufficient to convince any person.

However, I know it may be said, that the above average of twenty six farms to a parish, exceeds the diminution of houses, as calculated by *Dr. Davenant*; but let it be observed, that although the engrossing of farms decreases the inhabitants, it does not in proportion lessen the number of houses belonging to such farms; as the houses of such are converted into receptacles for labourers, or rather out door servants, thereby lessening the usual house or family servants.

Since then monopolizing, or engrossing of land, has been the cause in all ages, and in all states, of depopulation, should not parliament interpose, as heretofore it has done in a similar case, and put at once a stop to so notorious an evil.

Dr. Davenant observes, " That the lower
" people are drove from the country to the
" great cities and towns, which is the cause
" of depopulating the country." But that is not all, I rather think the remarkable emigration of people to our American colonies, constitute a great part of such depopulated numbers; proceeding from the same original

as

as those who fly to cities, &c. together with the encouragement given to industrious emigrants that go to America. †

Some people say, that such ought to be restrained by a law, prohibiting their departure without a licence or leave from some high power: I rather think, that such a restraint would be cruel, as bordering too much on arbitrary principles; but strike at once at the root, cut that off, and the tree will fall: stop the ill-judged engrossing of farms, and population will again retrieve itself. Remove the cause, and the effect will cease; give encouragement at home, and we shall find but few that will seek for it abroad.

SUR-

† When the reader is informed, that twenty thousand people went from England and Ireland, in the year 1773, to America, he will then readily conceive the probability of the state of depopulation, as has been mentioned. This has been faithfully asserted.

SURINAM POTATOES.

The following Directions for cultivating the SURINAM POTATOES, are given by the Venders of that Article—which Sort of Potatoe appears to be what is commonly known in the Country, by the name of the Hog Potatoe.

The views of the farmer may be different if he wants to make these potatoes a fallow, for which nothing can be better adapted, and to introduce them upon a large scale, he should plough the land (supposing it a stubble of corn) at Michaelmas, into beds four feet wide; and these beds should be thrown high and round. Thus let your land lie for the winter. As soon as the soil is dry enough in the spring, which on wet and moist land will not be till March or April, carry on your dung, the common sorts which have been made during the preceding winter in your stables, &c. Let this dung be laid down in small heaps along the furrows of the autumnal ridges, and laid along in them. Upon this dung lay the slices of the potatoes, at one foot asunder, in which way an acre will take up about ten bushels. Then let your ploughman divide the former ridges, throwing half one way and half

half another, by which he will cover both dung and potatoes. When the crop appears, it will be in rows at four feet equally distant. The following treatment must be by ploughing between the rows, to keep the land loose and free from weeds; and the rows themselves must be hand-hoed, so as always to be kept perfectly free from weeds.

If before the potatoes come up, the weeds should thicken, hand-hoe the tops of the ridges all over, which may be safely done three weeks after planting.

The stalks will cover the whole field and make a fine appearance; if after that, weeds should strike up, send in boys to weed them up by hand.

When the leaves turn black is the time to take them up, which may be done by the plough, dividing the ridges as before, with boys following to pick them up. If the land is strong, men should shake the furrows with small hay-forks, to expose the potatoes. The land will then be left in excellent order to harrow in wheat upon at once, or to leave for barley.

N. B. This method of planting and managing will effectually destroy all sorts of weeds.

Another

Another Method.

In the spring, when you cart your dung, spread it over all the land, and then divide the ridges as before: and in doing it, let the slices be laid along-side one of the middle furrows, so as to be covered by the next. By these means the whole ridge being dunged, the potatoes will be found all over it, which, when the land is quite clean, may be an advantage. In this way you must be cautious not to plough too near the rows while growing.

Another Method.

For no dung. Plough out three feet ridges, and in the spring divide them; let the ploughman turn a furrow from the ridge; nearly on the top of this furrow lay the slices; then let him come down, taking a furrow from the next ridge, and covering them. Manage as before. This way will take from twelve to fifteen bushels of seed.

Another Method.

For soils quite dry. Plough the stubble flat at Michaelmas. In March spread your dung over the whole, then plough it again flat; and after the plough, let boys lay the slices at one foot asunder in every third furrow.

B b

If

If your plough takes six inches, the rows will then be eighteen inches asunder; if nine inches, which is common, they will be twenty-seven inches asunder. Between these rows you may either horse or hand-hoe. This is the same with dung or without. From fifteen to twenty bushels per acre will be wanting for seed.

In whatever method they are planted, the land must be kept perfectly free from all weeds: spare not expence in this; liberality will be the best oeconomy.

When you have taken them up, lay them, without any cleaning, in a barn, surrounded by straw, to keep out the frost, and take them out as wanted. No use to which they can be applied demands washing, except boiling them for fat hogs; in which use you may either give them alone, or mixed with the meal of barley; but they fatten well alone.

An Acre.

	<i>l.</i>	<i>s.</i>	<i>d.</i>
Rent and tythe and parish taxes, suppose	-	-	-
Seed, 10 bushels	-	2	5
Two ploughings	-	0	10
Slicing, 2d. a bushel	-	0	1
Planting	-	0	2
Hand-hoeing the tops of ridges, if necessary	-	0	5
Carried over	4	3	8

Brought over	4	3	8
Ploughing between the rows 4 times	0	10	0
Hand-hoeing the plants thrice, at 4s. 2s. 6d. and 1s. 6d.	-	-	0 8 0
Hand-weeding if necessary	-	-	0 1 6
Ploughing up	-	-	0 5 0
Taking up and carrying home	1	10	0
The expence of manure every where is different---suppose the land poor enough to demand	-	-	5 0 0
			<hr/> 11 18 2

Such a cultivation will give a pro- duce of from 800 to 1200 bush- els on an acre, certainly 1000; they are worth in the feeding of any cattle 1s. 6d. a bushel	75	0	0
Deduct expences	-	-	11 18 2
			<hr/> 63 1 10

Besides the land made clean and very rich for
any other crop.

Since my two former publications, other
large cabbage for cattle, than what were
therein mentioned, has been in great esteem;
and for some years past a sort has been cul-
tivated by Mr, *William Austin*, at Walworth,
Surry, by no particular name, as he told me,
but that of the cattle cabbage. I have seen
them

them in many places, but not so large a quantity, or near equal to Mr. *Austin's* in weight, owing as I believe to the want of dung or richness of soil. He informed me that he sows the seed in August, and transplants them out in the spring, at about three feet distance, and waters them duly in very dry weather; and, 'till this year, he sold some in the market, and others he gave to the cattle. The past winter he disposed of most of them to some navy contractors, who made them into grout for the use of the soldiers, and seamen, on the American station: and by what I can observe, it is only the Scotch or Edinburgh cattle cabbage, improved in size, by means of particular enriched soil. According to Mr. *Austin's* information, one acre planted at three feet square, takes 4840 plants; these producing cabbages, at an average of 35lb. each, makes a weight of 75 tons, 12 hundred and an half per acre. But when we compare the weight of Sir *Robert Burdet's* North American cabbage to the former, the produce per acre will be found much greater; as, the account given of Sir *Robert's* cabbage, is, that they weigh from 60 to a 100 tons per acre, many of the cabbages weighing 80lb. and planted at four or five feet distance; yielding a sum of 36 pounds per acre. The seed is recommended by its advocates, to be sown early in the spring, and planted out in June

June. Note, such truths amazes the *Critical Reviewer*, whose knowledge being inclosed within a halfpenny roll, can have no idea of roast beef.

Siberian Barley.

The first account I received of *Siberian barley*, was in September 1771, viz. "That Sir *Walter Blacket's* gardener at Newcastle, sowed 7 grains of *Siberian barley*, which produced 322 stalks, and 9660 grains of corn *." On this I applied to a friend in London, to procure me, if possible, a few grains, which soon after I had the pleasure of receiving. There are two sorts, viz. the two rowed, and a six rowed; the former is much superior to the latter, both in grain, and increase, so much, that in my opinion the two rowed will prove a valuable acquisition to England, and the other, not worth cultivating. The above 7 grains produced, by this account, 46 stalks to each plant, and 30 grains to each stalk or ear on an average, making 1380 grains of corn to each plant. †

The

* Supposing an acre of land planted at one foot square with the two rowed *Siberian barley*, being in number 43560 plants, yielding as above, the produce would be 60,112,800 grains of corn; and 540 grains to one ounce, the weight would prove to be 6957 pounds, or a proportion of 108 bushels and an half per acre, at 64 pounds weight per bushel.

† Twenty ounces and three quarters nearly, from seven grains.

The few grains of the two rowed, which I received, being 225, produced 8 pounds and an half, * in the year 1772. These 8 pounds being sowed in April 1773, produced only three bushels, owing to the foulness of the ground which choaked it up; herein I was much disappointed, as being assured from my friend of the good tilth the field was in; I chose rather to make an experiment at a distance, on its increase, than with myself, in order to avoid the appearance of the least partiality towards it. *Siberian barley* is quite different in the grain from any other, being more like wheat than barley, but it has a much thinner cover or skin than wheat, and much larger and weightier than the best wheat.

Gerard's account of naked barley, seems to agree nearly with that of the *Siberian*; he calls "Naked barley, *Hordeum nudum*; "also called *Zeophyrum* and *Triticum Speltum*, "because it is like *Zea*, otherwise called " *Spelta*, † and is like unto that which is " called *French barley*. The plant is altogether

* Which would have been double that quantity, if the birds, who are great devourers of this grain, had not destroyed it.

† See winter riches P. 229. But if the *Hordeum nudum* be the *Zea* or *Spelta*, *Spelta* cannot be the English Gray wheat, as some authors has it; nor can it be in my opinion the sort called *Siberian Barley*.

“ gether like unto Spelta, except that the
 “ ears are rounder, the eiles or beards
 “ rougher and longer, and the seed or grain
 “ naked without husks, like to wheat, the
 “ which in its yellowish colour it some-what
 “ resembles, and is sown in several parts of
 “ Germany for the same uses as barley.”

We are informed from the Society for encouragement of Arts and Commerce, it answers well as to malt; and beer brewed from it is exceeding good; so that as before observed, it promises to be a valuable acquisition, as the few grains I first sowed would have been at least 312 fold increase, if the birds had not destroyed it. Since the above period I have experienced its worth so much, as to pronounce it a very valuable grain, Tho’ I am sorry to say, the farmers will not yet embrace it.

Here I cannot avoid making a small digression on other instances of produce. Mr. *Everard* says, that in the year 1692, he made a steep for wheat, consisting of one gallon of rain water, and two pounds of unslaked lime, and stirred it three times a day for three days; the fourth day he put in four ounces of common nitre, and one pound of Pigeons dung, stirring them three or four times a day for four days more, and then strained off the liquor.

To

To one quart of this liquor he put one handful of wheat, and steeped it for 18 hours: the wheat was then taken out and laid in the air to dry, then steeped a second time in the liquor 12 hours more, and then dried as before; after this a third steeping was made for six hours, and then planted it in common earth, ten inches asunder,* and length of a finger deep.

From several plants he had 60, or 70, and from one 80 stalks, with large ears, and grain; many ears being six inches in length, and containing from 40 to 60 grains in an ear; the weight of which Mr. Everard has not mentioned.

However, let us state the average of ears to each plant, at 40, and the average number of grains to each ear at 35, the number of grains to each plant would be 1400; and, if such plants were at one foot square,† instead of ten inches, the number of grains would be 60,984,000, which, at 700 grains to one ounce, would produce upwards of 86 bushels at 63 pound weight per bushel.

We have been also told, that one plant of wheat produced 24 ears, weighing six ounces, that

* At this Space, five pounds nine ounces of wheat will plant an Acre.

† Would be 43560 plants to one Acre, to seed which would be but three pounds fourteen ounces three drams nearly. See the table, *Rational Farmer*, 2d edit. P. 70.

that the ears were seven inches long, and that each ear had 100 grains.

Pliny tells us, that the *Procurator General* sent from *Africa* † to *Augustus Cæsar*, one plant of common wheat which had 400 stalks. And to the *Emperor Nero*, one that had 360 stalks. And that in *Sicily*, within the territory of *Leontium*, there have been fields wherein one grain put forth no fewer than a hundred stalks with ears upon them: and in many other parts of that island, and commonly in all the kingdom of *Granada*, and *Andalusia* in *Spain*.

Mr. Wynne Baker informs us, that from six grains of wheat he had an yield of 5710 grains, weighing ten ounces; that there were 29 ears to each plant on an average, and 951 grains to each plant; weighing in a proportion of 571 grains to one ounce, or, one ounce ten drams nearly to each plant.

But I shall now mention a more recent account of extraordinary yield from one plant, to which I was a witness, in the year 1771, at his Grace the Duke of *Ancaſter's*, at *Grimsthorpe*

† In parts of *Africa* they have two or three Harvests in the year. And *Pliny* tells us, that there is a sort of wheat in the *Thracian Gulph*, called a two month wheat; that no wheat is more weighty, and yields no bran at all; that great use is made of it among the inhabitants of the mountains in *Sicily* and *Achaia*.

thorpe in Lincolnshire, from which plant I gathered 56 ears, and the person then presiding over the garden assured me, that upwards of 20 ears had been plucked off through wantonness. These 56 ears contained 2180 grains, weighing 4 ounces, and being in quality so very extraordinary that no more than 545 grains went to one ounce, * numbers did not lessen the quality; and except in this instance, I have not weighed any wheat whereof fewer than 600 grains made an ounce in weight, † by which a Winchester eight gallon bushel will weigh 64 pounds nearly.

Were one acre, at one foot square, covered with such plants, the produce would be 170 bushels at 64 pounds weight per bushel, and an encrease of 2180 fold.

When land has been in good heart and fresh, we have had frequent instances of very large produce. I have known 432 bushels of wheat produced from three acres, in three years crops, in the course of a seven years tillage; being 48 bushels per acre, statute measure.

* Seven hundred grains of wheat to one ounce is the acknowledged average of good merchantable wheat.

† The large fine grain, and uncommon produce induced me to keep it as a curiosity. It was an accidental seed dropped in his Grace's garden, which grew unattended to.

measure. † And a near relation of mine had 64 bushels per acre, from two fields of four acres each. All which may be sufficient to shew how much land is capable of producing.

I shall conclude this Treatise by strenuously recommending to the Tiller of land, to be the *Good Husbandman*, to seek after knowledge from impartial experiments, and scientifick principles; to cultivate his land as his understanding, by assiduity, reason, and information; free from prejudice of education, or custom; with a heart always open to conviction.

† This the Chamber Critick is unacquainted with.

F I N I S.

E R R A T A.

Page 50. line 4. read, Swing, or a Norfolk Plough.

86. l. 20. r. sufficient to an acre.

103. note † instead of p. 67. r. p. 69.

126. l. 6. leave out, supposing.

128. l. 20 instead of, along. r. alone.

145. l. 20. instead of root, r. rot.

146 note * instead of p. 62. r. p. 91.

147. note † l. 3, instead of p. 60, r. p. 92.

148. l. 16. instead of neither cases, r. either case.

148. note † l. 2. r. other causes of affecting corn, see the following pages, and Dr. Tissot's Narrative, &c.

149. note * instead of p. 33. r. p. 48.

150. note † instead of p. 43 r. p. 64.

165. l. 12. instead of one Quarter per cock, r. one Quart per cock.

180. l. 20. r. average 26, not average of 26

And a new relation of mine had
of highest per acre, from two fields of four
acres each. All which may be sufficient to
show how much land is capable of producing.
I shall conclude this Treatise by frequently
recommending to the Father of land, to be
the Great Improvement of his own knowledge
from his own experience and observation
to cultivate his land as his un-
derstanding, by his own and infor-
mation, from the principles of education, or
common sense, with a heart always open to con-
sideration.



† The two Chamber Cattle is unacquainted with.

F I N I S

E R R A T A

Page 10. For a read, Swine, or a Norfolk Plough.
101. For a read, Swine, or a Norfolk Plough.
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